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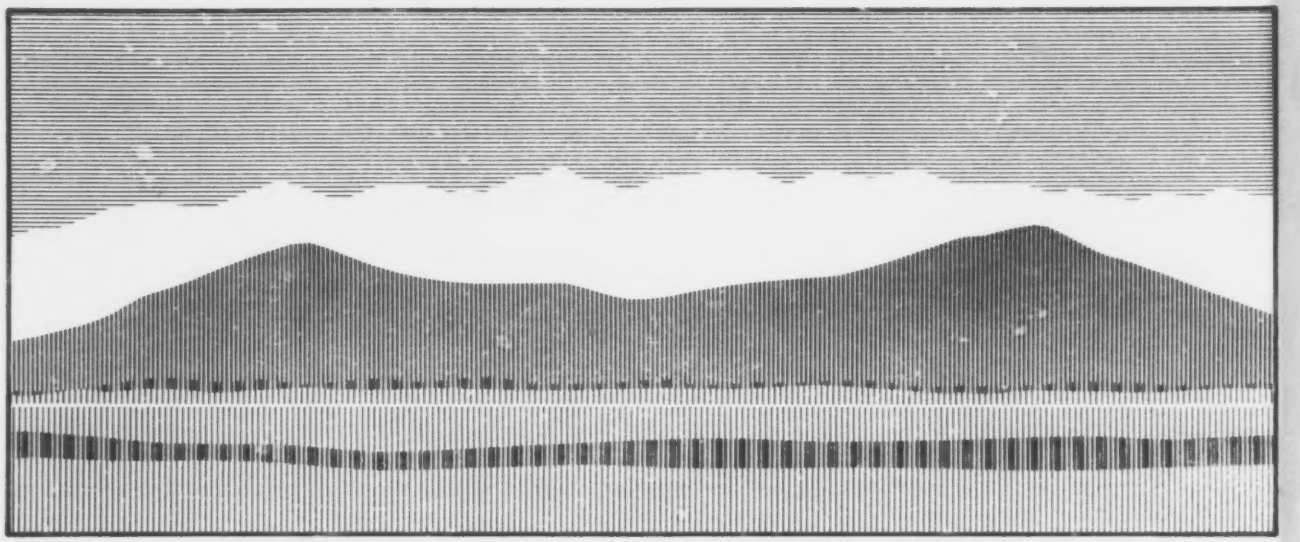
ENVIRONMENTAL IMPACT STATEMENT



MOLYCORP GUADALUPE MOUNTAIN TAILINGS DISPOSAL FACILITY

Prepared for:

BUREAU OF LAND MANAGEMENT

ALBUQUERQUE, NEW MEXICO

BLM-NM-ES-89-003-4130

DECEMBER 1988

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DRAFT ENVIRONMENTAL IMPACT STATEMENT

MOLYCORP GUADALUPE MOUNTAIN TAILINGS

DISPOSAL FACILITY

(x) Draft Final ( )

Lead Agency:	U.S. Department of the Interior Bureau of Land Management
Counties Directly Affected:	Taos County, New Mexico
Comments on this EIS should be directed to:	Robert T. Dale Bureau of Land Management Albuquerque District Office 435 Montana N.E. Albuquerque, NM 87107 Telephone: (505) 761-4546 (FTS 474-4546)
Date Draft EIS made available to the Environmental Protection Agency and the public:	December 2, 1988
Date by which comments on this Draft EIS must be received to be considered in the Final EIS:	February 9, 1989

Abstract: Molycorp proposes to construct and operate a molybdenum tailings disposal facility on 1,230 acres of public land near Questa, New Mexico and has located mill site claims for this purpose in accordance with 30 U.S.C. Section 42. The project would consist of a 568-acre tailings pond in the saddle of Guadalupe Mountain. The pond would be formed by the construction of two rock-filled dams at either end of the saddle. Other facilities would include a tailings pump station, an extension of the tailings pipeline, tailings distribution lines, access roads and a patrol road, a powerline, a seepage collection pond, surface water diversion channels, and a decant water channel. The project would provide additional storage for approximately 200 million tons of tailings from Molycorp's molybdenum mine located approximately 12 miles east of Guadalupe Mountain. The Bureau of Land Management completed an Environmental Assessment (EA) for this project in February 1985. As a result of that EA, the BLM determined that an Environmental Impact Statement (EIS) would be required. This EIS analyzes and documents the environmental impacts of the proposed project through construction, operation, and closure.

Recommended:

Robert T. Dale, District Manager
Albuquerque District Office

Approved:

Larry L. Woodard, State Director
New Mexico State Office

Public Hearing Information

The Bureau of Land Management (BLM) will hold public hearings on this document during the 60-day public review period. The purpose of these hearings is to take oral testimony on the scope and adequacy of the Draft EIS. A BLM official will preside over each hearing. All testimony will be recorded and placed in the permanent project file. A summary of the substantive comments contained in the testimony will be included in the Final EIS (together with the written comments received on the Draft EIS). The Final EIS will present responses to comments made at the hearings and contained in the written comment letters.

Public hearings on this Draft EIS will be held at the following times and locations:

- January 20, 1989 St. Anthony Parish Hall Questa, New Mexico 7:00 p.m.
- January 21, 1989 Ramada Inn Conference Room Taos, New Mexico 10:00 a.m.

SUMMARY

Purpose and Need

Molycorp, Inc., a wholly owned subsidiary of Unocal Corporation, is proposing to construct and operate a molybdenum tailings disposal facility near Questa, New Mexico. Molycorp has filed millsite locations on public lands in the Guadalupe Mountain area just west of Questa, and the Bureau of Land Management (BLM) has determined that the proposed tailings disposal facility would constitute a valid use of the land for millsite purposes as provided under the General Mining Laws [U.S. Department of the Interior (U.S.D.I.) BLM 1985]. The BLM evaluated the impacts of construction and operation of the tailings facility in an Environmental Assessment (EA) dated February 1985. Because of continuing questions and concerns from the public and other reviewing agencies, the BLM concluded in their Record of Decision that an Environmental Impact Statement (EIS) would be required to complete the environmental analysis and documentation process for the project.

Molycorp has operated a molybdenum mining and milling operation near Questa, New Mexico since the 1920s. Mining operations expanded to open pit operations in 1964. Construction of a larger mill created a need for a sizable tailings disposal site for the operation. Initial construction for the existing tailings disposal site located west of Questa and 1.5 miles east of Guadalupe Mountain began in 1964. Currently, two impoundments (referred to as Sections 35 and 36) provide tailings storage capabilities. At the present time Molycorp's mining and milling operations have been temporarily stopped due to the depressed price of molybdenum.

The conversion of Molycorp's open pit mine to an underground mining operation and modernization of the mill has extended the potential life of the mine and will ultimately result in a greater amount of tailings than the existing facility can accommodate. At maximum designed production capacity of the Molycorp mine and mill, approximately 18,000 tons per day (tpd), or 6.5 million tons annually, would be milled and disposed of at the tailings disposal sites. A total of 250 million tons of storage is required to ensure continuous production from the Questa mining operation. The remaining storage in Sections 35 and 36

would provide for less than one-half of the needed long-term tailings storage; however, continued operation of Section 35 and the proposed Guadalupe tailings facility would provide design capacity for approximately 40 years of operation.

Molycorp expects to re-open, and expand, their existing operations as soon as the molybdenum market allows for production at profitable levels. Given the length of time involved in securing the new site, in addition to initial construction requirements, the company is proceeding with the permitting process to obtain the necessary approvals for use of the site to prudently plan for the future.

Project Description

The proposed Molycorp Tailings Disposal Facility Project would involve construction, operation, and eventual closure and reclamation of a tailings pond in the saddle on Guadalupe Mountain. The proposed project site is located approximately 3 miles northwest of the Village of Questa in Taos County, New Mexico, and borders the northwest side of Molycorp's existing tailings disposal area (Figure I). The project area encompasses a total of 1,230 acres. The project would provide additional storage for approximately 200 million tons of tailings from the company's molybdenum mine about 12 miles east of Guadalupe Mountain.

Development of the Guadalupe site would entail clearing, grading, and excavation of fill material for construction of two dams. Other ancillary facilities would include:

- a pumping (tails booster) station,
- an extension of the tailings pipeline,
- tailings distribution lines,
- an access road and a patrol road around the perimeter of the pond and dams,
- a powerline,
- a collection pond and dam (for dam seepage),
- surface water diversion channels, and
- a decant water channel or pipeline.

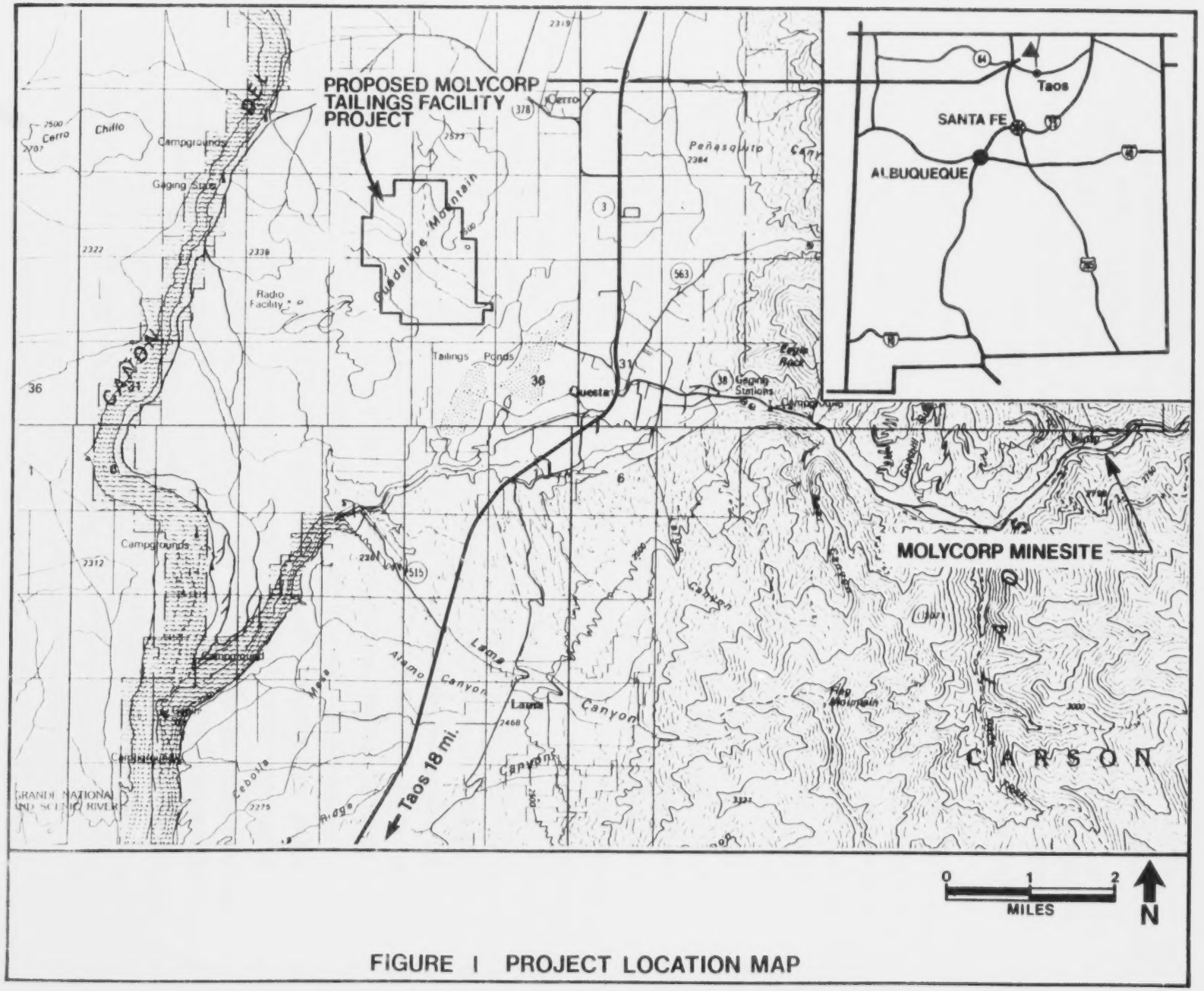

FIGURE 1 PROJECT LOCATION MAP

The entire site would be fenced to prevent unauthorized access to the tailings pond. Detailed specifications of these facilities will be developed during the detailed engineering phase of the project.

To form the tailings impoundment, two rock-filled dams would be constructed at opposite (east and west) ends of the saddle which separates the two peaks of Guadalupe Mountain. At full development, the tailings storage surface area would cover approximately 568 acres.

The design of the tailings dams would incorporate standard rock fill techniques based on accepted center line construction methods. The upstream faces of the dams would be sealed with soil and an impervious membrane to inhibit water flow through the dam. A drainage system would be installed within the dam and any seepage collected would be routed with the decant water to the existing ion-exchange plant. The outside faces of the dams would be revegetated following each development stage (50-foot development increments) to lessen visual contrasts.

A pumping station would be constructed at the east base of Guadalupe Mountain and a 3.5-mile pipeline extension would be constructed to transport the tailings slurry to the new impoundment. The access road would be approximately 60 feet wide and 1.5 miles long leading from the existing facility to the eastern edge of the saddle. In addition, a 20-foot wide patrol road would be required around the perimeter of the tailings pond and the dams. An electrical power distribution line would follow the proposed access road. Molycorp would tap the existing 69-kV transmission line on the western edge of the existing tailings facility and transmit 13.8-kV to the site via 40-foot "T" configuration wood distribution poles.

Depending upon demand for molybdenum, construction would begin after approval of the Plan of Operation and would continue in stages throughout the life of the project. Construction would require a workforce of about 30, all employees of Molycorp or a contractor. Equipment would include standard earth-moving equipment such as a grader, bulldozer, haul truck, crusher, scraper, drill, and shovel.

Ore from the underground mine would be similar to that encountered in the open pit, therefore the milling process, including reagents,

would not change over what has been used in the past. Most of these reagents are molybdenum collectors, and the bulk of the reagents adhere to the molybdenum disulfide concentrate. Therefore, only trace amounts remain in the tailings.

During operation, the tailings would be transported as a slurry via Molycorp's existing tailings pipeline to the existing impoundments, then through the pump station and up the slope to the Guadalupe Mountain impoundment. The slurry would consist of 60 percent by weight water and 40 percent solids.

Tailings would be distributed around the perimeter of the pond in a manner to provide an even distribution of the tailings and to provide a central location for impounded water (clarification pond). The topography of the proposed tailings pond, as compared to the existing ponds, would allow for multiple, simultaneous discharge points which will increase the amount of beach area that can be kept wet, and consequently reduce the potential for fugitive dust emissions. At full development, the surface area of the tailings storage facility would be approximately 568 acres. Of this area, less than 200 acres would be in dried tailings at any point in time. Dry areas of the tailings impoundment would be periodically sprayed with a chemically inert stabilizer to form a crust and reduce fugitive dust emissions. After the tailings solids settle out, the surface water and collected seepage from the dams would be transported via open, lined channel or pipeline to the existing ion-exchange plant where residual molybdenum would be removed prior to discharge to Pope Lake and the Red River.

Molycorp has committed to, and incorporated into their Plan of Operations, engineering design and operational practices for the tailings facility as described by Geocon (1988). These practices are summarized in Chapter 1 of the Draft EIS.

A closure plan must be approved by the State Engineer at the final stage of construction. The plan would describe specific measures to be taken to ensure long-term stability and to reclaim the site for future use. The Molycorp Tailings Disposal Facility is expected to operate for 40 years, based on full-scale mining. At the end of the operating period, all surface facilities would be removed and disturbed areas would be reclaimed. Topsoil would be spread over the surface of the

dried tailings to a minimum depth of 1 foot, and the area would be seeded with an approved seed mixture. Soils for capping the tailings would be taken from throughout suitable locations on Molycorp's property. Tree and shrub species would be planted within several years, or following establishment of the grasses.

Issues and Concerns

Several issues or concerns related to the proposed project were identified as a result of the 1985 EA and during the scoping meetings that were held in July 1986 prior to preparation of the EIS. Additional discussion about the scoping meetings is presented in Section 4.0, Consultation and Coordination and in Appendix A, Scoping Documentation.

The scoping process, as defined under the implementing regulations for NEPA (40 CFR Part 1501.7), is used not only to identify significant environmental issues deserving of study, but also to deemphasize insignificant issues, thus narrowing the scope of the EIS process accordingly.

In December 1986, the BLM distributed a public information document to approximately 225 interested persons. The public information document included a detailed summary of scoping results, BLM responses to selected comments received during scoping, and the BLM Field Solicitor's opinion on concerns regarding future patenting of the Guadalupe site. These items are attached as Appendix A to the Draft EIS.

The primary issues that were identified as appropriate to be addressed in the Draft EIS included:

- potential effects to surface and groundwater quality (e.g., effects on well users, the Rio Grande, and the Arsenic Springs System; seepage considerations),
- air quality issues associated with windblown dust,
- potential health hazards associated with windblown dust,
- visual impacts of the dams,
- effects on local recreation/tourism,
- effects on the local employment/economy,

- noise effects, and
- loss of archaeological values.

New issues that were identified during scoping resulted in the decision to include a discussion of health risks associated with inhalable silica and dust in the Draft EIS. It was also decided that additional data were required to assess impacts related with air quality, groundwater, and socioeconomic concerns. This additional data collection resulted in a delay in the original EIS schedule.

Impact Conclusions

A summary of impacts that would result from construction, operation, and abandonment of the proposed project are presented in Table I. Detailed discussion of impact analysis and mitigation can be found in Chapter 3 of the Draft EIS, Environmental Consequences.

TABLE I

SUMMARY OF IMPACTS

Resource	Type of Impact	Extent of Impact
Air Quality	During operation of the tailings pond, potential infrequent exceedances of the State of New Mexico total suspended particulate (TSP) standard may occur in the immediate vicinity of the tailings pond when dry and during periods of high winds	Long-term, potentially significant because of exceedance of standard unless properly mitigated
Water Resources	Downward seepage of the tailings solution to the regional water table	Long-term, no predicted exceedances of water quality standards
Topography/ Geology	Alteration of topography; displacement of geologic material for dam construction	Long-term
Soils	Disturbance of 825 acres of soil resources; loss of 97 acres of potentially salvageable topsoil	Long-term
Vegetation	Disturbance of 825 acres of vegetation (87 percent pinyon-juniper and upland forest types).	Long-term
Wildlife	Loss of 825 acres of terrestrial wildlife habitat with associated reduction in wildlife carrying capacity; no aquatic impacts	Long-term
Land Use	Prime and unique farmland	No impact
	Reductions in public land AUMs on two allotments (one of which is in active use)	Long-term
Recreation	Reduced access to a portion of the Guadalupe Mountain area	Long-term
Visual Resources	Construction of the dams and the inability to reclaim the dam faces to blend with surrounding terrain	Long-term, significant because of conflict with BLM VRM Class II objectives

TABLE I (CONTINUED)

Resource	Type of Impact	Extent of Impact
Noise	Construction-related noise (e.g., blasting) would be a noticeable increase over ambient levels at area campgrounds	Short-term, intermittent
Cultural Resources	Disturbance of 11 archaeological sites considered eligible for National Register of Historic Places	Long-term, no adverse effect if mitigated according to the data recovery plan
Socioeconomics	Economy and employment	Minimal impact
	Public fiscal conditions	Fiscal tax-related benefits to county
	Housing and public services	No impact
Health Risk	Public exposure to windblown tailings dust	Long-term, no predicted exceedance of PM-10 standard, and no health threat to the public

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1.0 DESCRIPTION OF THE PROPOSED ACTION

1.1 Background

Molycorp, Inc., a wholly owned subsidiary of Unocal Corporation, is proposing to construct and operate a molybdenum tailings disposal facility near Questa, New Mexico. The location of the proposed project is shown on Figure 1-1. Molycorp has filed millsite locations on public lands in the Guadalupe Mountain area just west of Questa, and the Bureau of Land Management (BLM) has determined that the proposed tailings disposal facility would constitute a valid use of the land for millsite purposes as provided under the General Mining Laws [U.S. Department of the Interior (U.S.D.I.) BLM 1985]. The BLM evaluated the impacts of construction and operation of the tailings facility in an Environmental Assessment (EA) dated February 1985. Because of continuing questions and concerns from the public and other reviewing agencies, the BLM concluded in their Record of Decision that an Environmental Impact Statement (EIS) would be required to complete the environmental analysis documentation process for the project.

Molycorp has operated a molybdenum mining and milling operation near Questa, New Mexico since the 1920s. The mine is located approximately 12 miles east of Guadalupe Mountain (Figure 1-1). Mining operations expanded to open pit operations in 1964. Construction of a larger mill created a need for a sizable tailings disposal site for the operation. Initial construction for the existing tailings disposal site located west of Questa and 1.5 miles east of Guadalupe Mountain began in 1964. Currently, two impoundments (referred to as Sections 35 and 36) provide tailings storage capabilities.

Mining operations in the pit have been phased out in favor of an underground mining operation that was begun in 1983. The mill has been renovated and modernized to increase efficiency and is designed to treat a maximum of 18,000 tons per day (tpd) of ore from the underground mine. Expansion of the tailings disposal capacity is required in conjunction with the increased life of the mining operations.

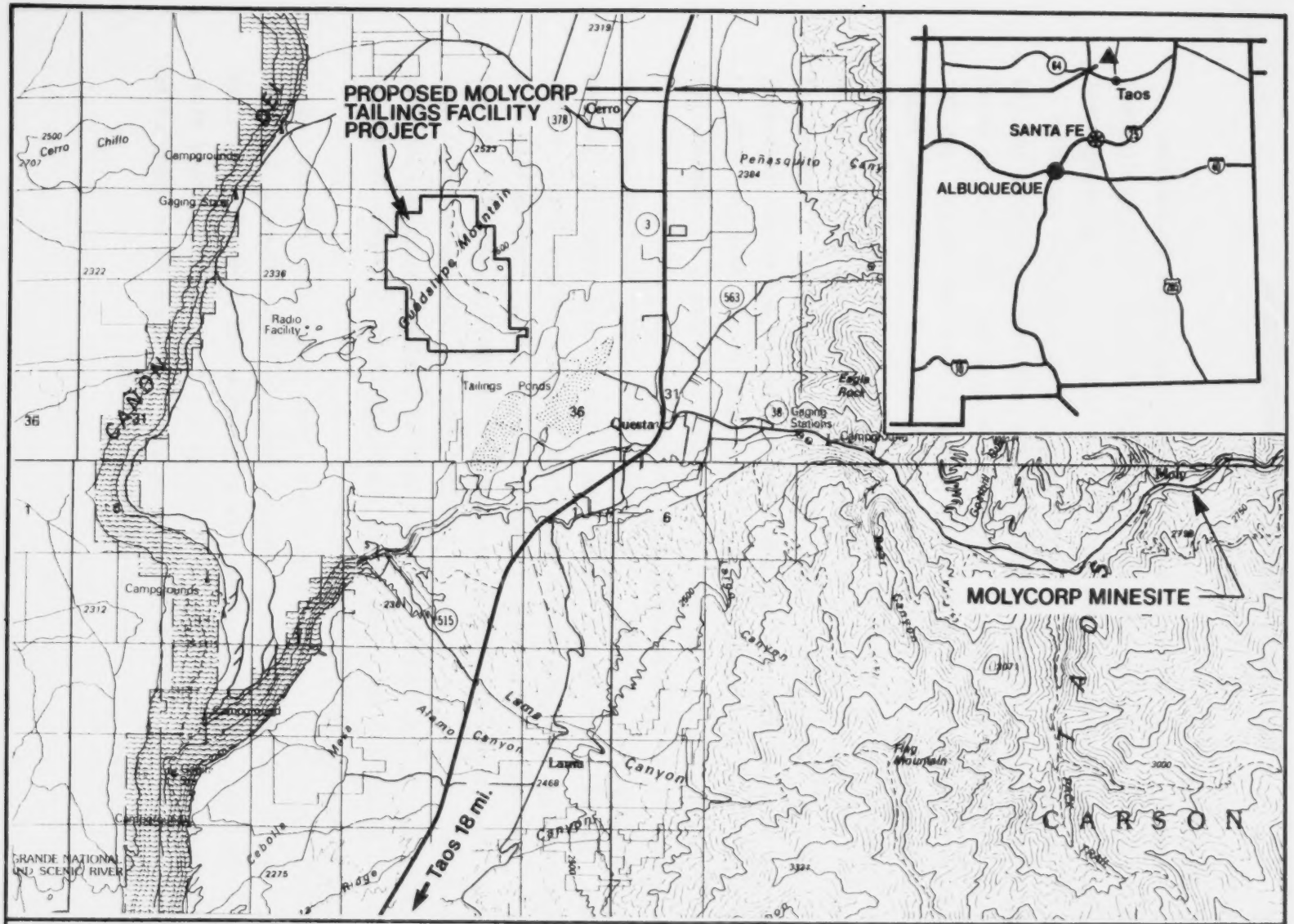


FIGURE 1-1 PROJECT LOCATION MAP

1.2 Purpose and Need

The conversion of Molycorp's open pit mine to an underground mining operation and modernization of the mill has extended the life of the mine and will result in a greater amount of tailings than the existing facility can accommodate. At designed production capacity of the Molycorp mine and mill approximately 18,000 tons of tailings per day, or 6.5 million tons annually, can be milled and disposed of at the tailings disposal sites. A total of 250 million tons of storage is required to ensure continuous production from the Questa mining operation. The remaining storage in Sections 35 and 36 would provide for less than one-half of the needed long-term tailings storage; however, continued operation of Section 35 and the proposed Guadalupe tailings facility would provide capacity for approximately 40 years of operation.

Molycorp expects to re-open and expand their existing operations as soon as the molybdenum market allows for production at profitable levels. Given the length of time involved in securing the new site, in addition to initial construction requirements, the company is proceeding with the permitting process to obtain the necessary approvals for use of the site to prudently plan for the future.

1.3 Project Description

The proposed Molycorp Tailings Disposal Facility Project would involve construction, operation, and eventual closure and reclamation of a tailings pond in the saddle on Guadalupe Mountain. The proposed project site is located approximately 3 miles northwest of the Village of Questa in Taos County, New Mexico, and borders the northwest side of Molycorp's existing tailings disposal area (Figure 1-2). A total of 1,230 acres are included within the project area. The project would provide additional storage for approximately 200 million tons of tailings from the company's molybdenum mine about 12 miles east of Guadalupe Mountain.

1.3.1 Construction

Development of the Guadalupe site would entail clearing, grading, and excavation of fill material for construction of two dams. Other ancillary facilities would include:

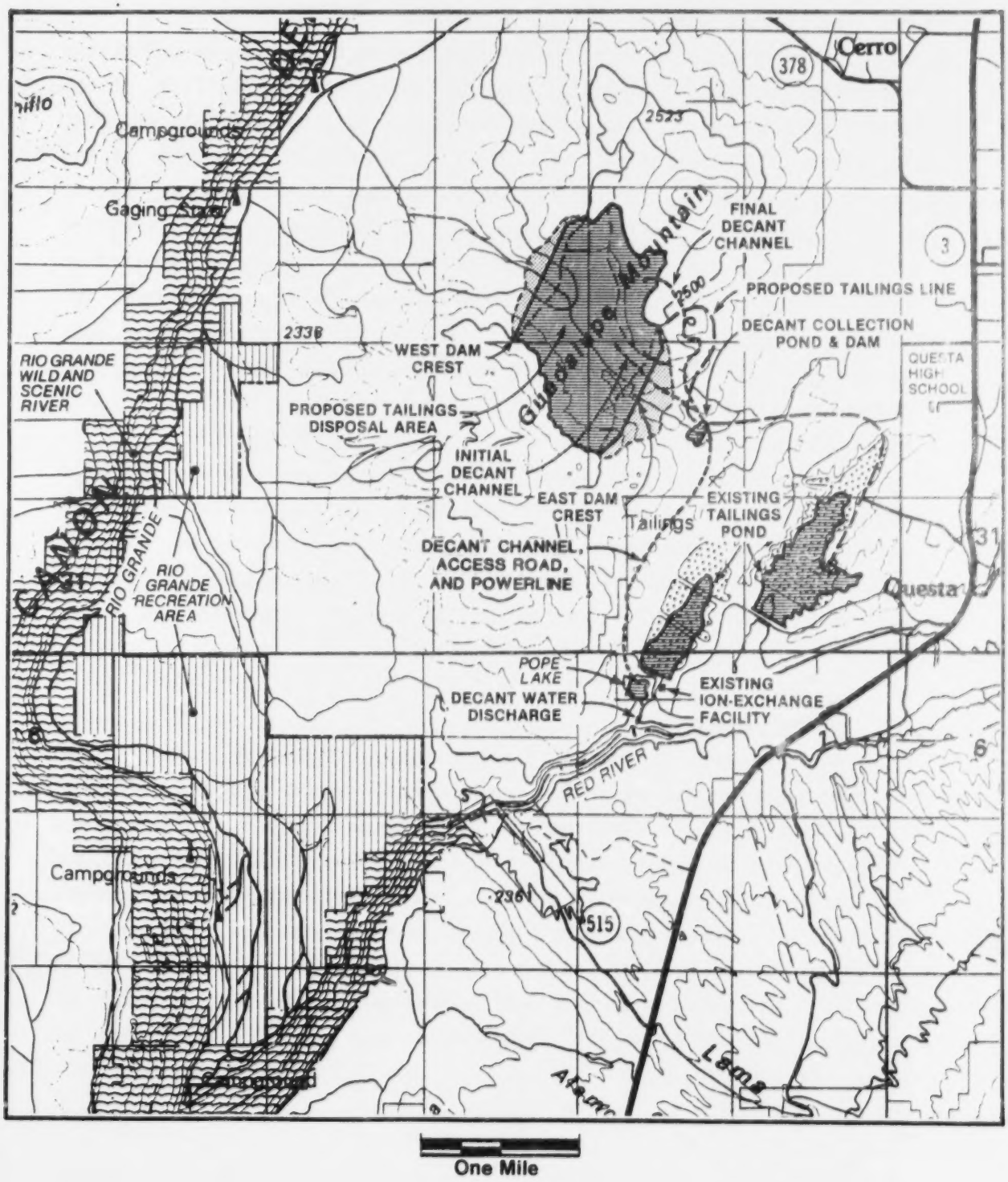


FIGURE 1-2 PRELIMINARY SITE LAYOUT

- a pumping (tails booster) station,
- an extension of the tailings pipeline,
- tailings distribution lines,
- an access road and a patrol road around the perimeter of the pond and dams,
- a powerline,
- a collection pond and dam (for dam seepage),
- surface water diversion channels, and
- a decant water channel or pipeline.

The entire site would be fenced (three-strand barbed wire) to prevent unauthorized access to the tailings pond. Detailed specifications of these facilities will be developed during the detailed engineering phase of the project. Estimated acreages of the disturbed areas associated with the project facilities are shown in Table 1-1.

To form the tailings impoundment, two rock-filled dams would be constructed at opposite (east and west) ends of the saddle which separates the two peaks of Guadalupe Mountain. Initial construction would require about 2 to 3 million cubic yards of material, giving an initial storage capacity of about 28 million tons (for 4 years of active operation, based on a mill capacity of 18,000 tons/day). The raising of the dam would be in 50-foot increments and would ultimately require 20 to 25 million cubic yards of material. The heights of the dams at total build-out would reach an elevation of 8,200 feet. Figures 1-3, 1-4, and 1-5 show the tailings disposal area at different stages of development and operation. At full development, the tailings storage surface area would cover approximately 568 acres.

The natural soils and overburden on the valley floor would act as a seepage barrier during the initial stages of operation and would be left in place. All rock fill for construction requirements would be quarried from the interior flanks of the north and south peaks within the 1,230-acre site (see Figure 1-5). Select borrow, if required, would come from other locations on Molycorp's property near the existing

TABLE 1-1

ESTIMATED DISTURBANCES ASSOCIATED WITH THE PROPOSED PROJECT AT FINAL DEVELOPMENT[1]

Project Component	Acres
Tailings Pond and Dams	717
Quarries	46
Collection Pond and Dam (dam seepage)	6
Equipment and Personnel Site	7
Access Road	11
Patrol Road	14
Perimeter Diversion Ditches	5
Tailings Line	5
Decant Channel	3
Powerline	5
Perimeter Fencing	6
Total	825

[1] Does not include additional disturbances outside of the claims area boundary on existing Molycorp property such as the tailings line extension, decant channel, access road, and powerline.

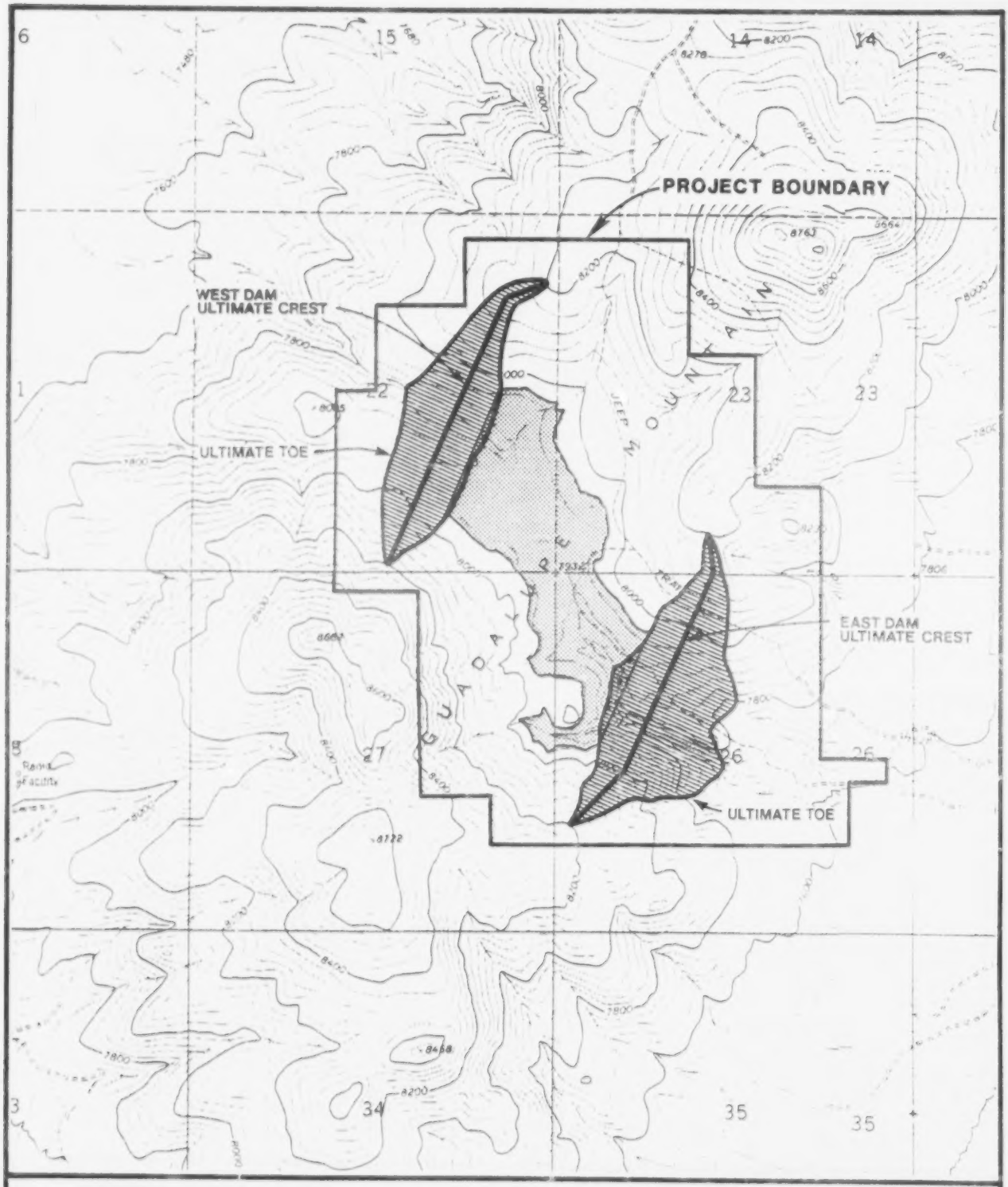


FIGURE 1-3 INITIAL DEVELOPMENT STAGE FOR THE TAILINGS FACILITY

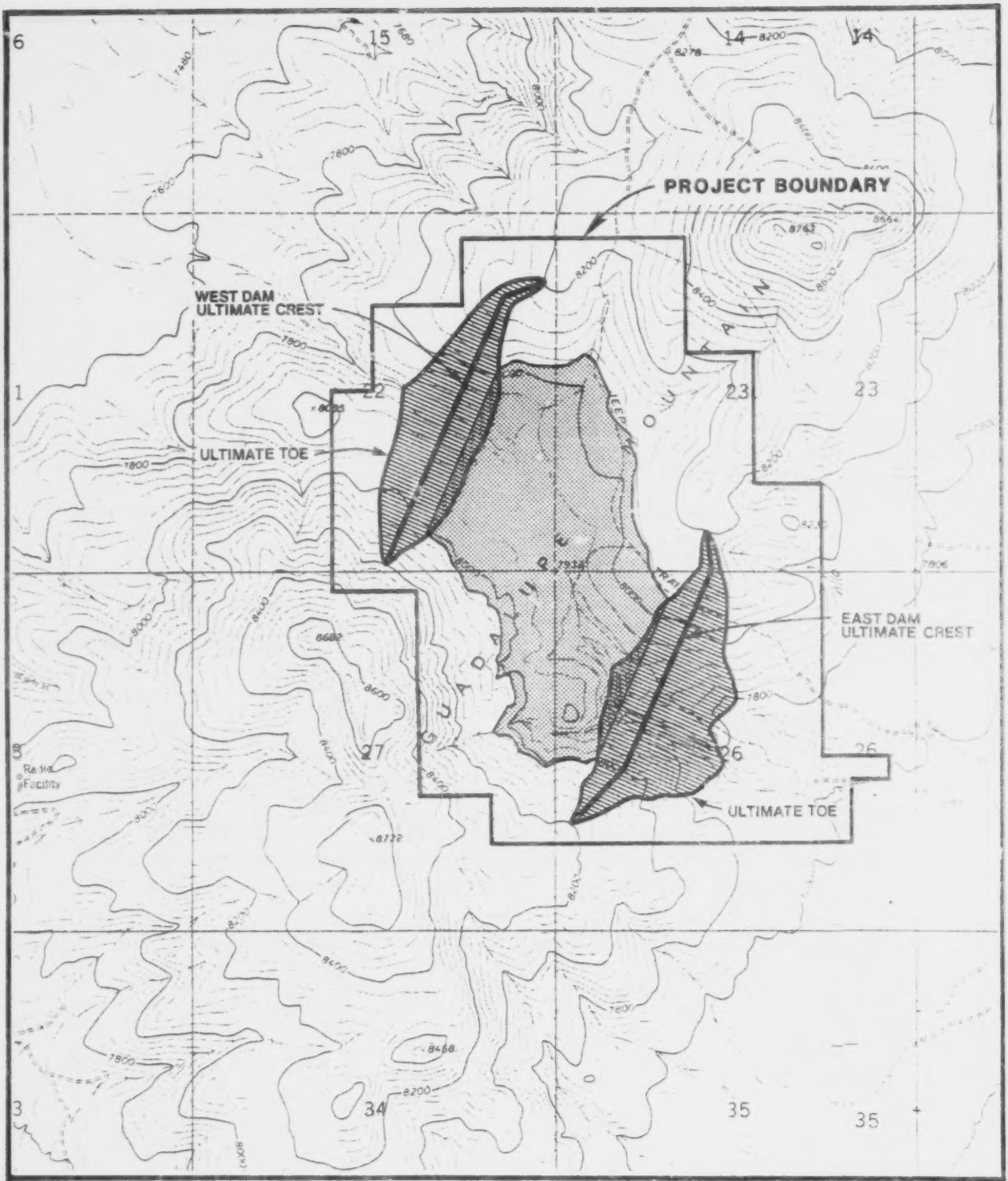


FIGURE 1-4 INTERMEDIATE DEVELOPMENT STAGE FOR THE TAILINGS FACILITY

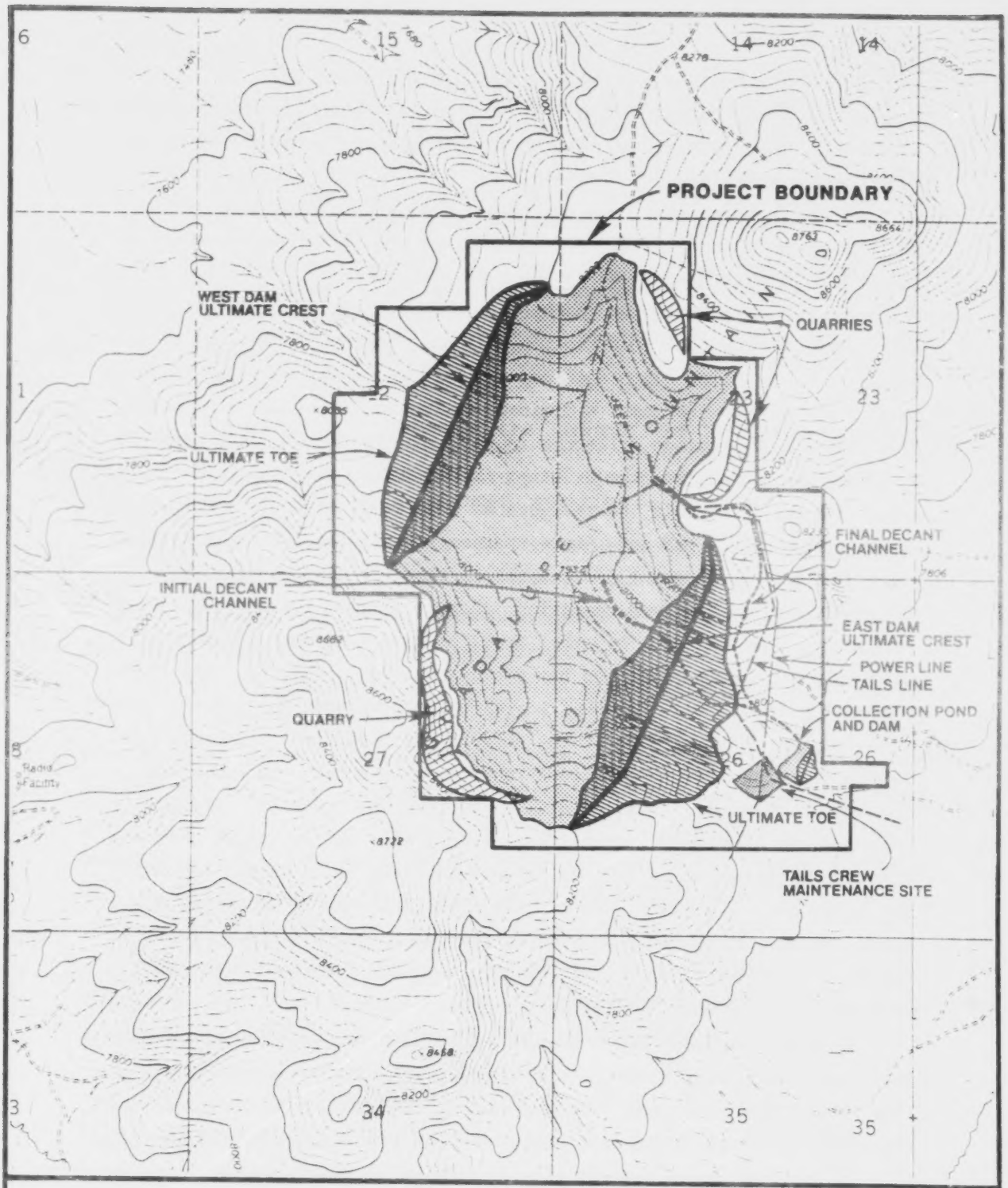


FIGURE 1-5 FINAL DEVELOPMENT STAGE FOR THE TAILINGS FACILITY

tailings ponds. Test drilling will be required prior to design of the structures to determine the structural strength and permeability of the construction materials.

At the present time, only conceptual dam designs have been reviewed by the State Engineer's Office. Preliminary and final design would be completed after BLM approval of the Plan of Operations. The design of the tailings dams would incorporate standard rock fill techniques based on accepted center line construction methods. The upstream faces of the dams would be sealed with soil and an impervious membrane to inhibit water flow through the dam. A drainage system would be installed within the dam and any seepage collected routed with the decant water from the clarification pond to the existing ion-exchange plant. The outside faces of the dams would be revegetated with seed mixtures and species acceptable to the BLM and State Engineer following each development stage (50-foot development increments) to lessen visual contrasts.

The construction and operation of impoundments are controlled by regulations established by the State Engineer. Sound engineering practices will be applied to the design of each facility. The State Engineer's office will be involved with the proposed impoundment from conception to final closing of the site. After a design is accepted and construction begins, monthly construction reports will be submitted to the State Engineer covering all activities on the site. Engineers representing the State Engineer may inspect and review the site at any time during construction and may require that any tests deemed necessary be performed. A completion report will be submitted by Molycorp, and a final inspection of the site will be performed by the State Engineer to verify completion of each construction stage and to review the overall plans prior to approval of additional construction.

Initial engineering design and representative tailings management practices were incorporated into the impact analysis in Chapter 3 of this Draft EIS. Molycorp has committed to following these practices as provided by Geocon (1988) and they have been included with Molycorp's Plan of Operations. A summary of practices is provided below:

- Molycorp will minimize sustained contact of open water from the clarification pond with the natural ground by locating the clarification pond and decant facility in the central portion

of the impoundment basin and by discharging tailings alternately from a number of strategically located points along the flanks of the valley between the main dams.

- Molycorp will limit the depth of any borrow pits developed within the impoundment basin to avoid exposing the more pervious fractured bedrock underneath the overburden.

- Molycorp will develop rock quarries from the impoundment basin in a manner that promotes free runoff of water towards the active tailings impoundment area, so that subsequent discharge of tailings slurry directly over such a quarry will enable deposition of tailings solids over the exposed rock surface without long-term ponding of clear water.

- Molycorp will minimize the area of the clarification pond. Subject to water depth and other operational details, it is believed that a 50-acre pond (or possibly less) would be sufficient for the planned operation.

A pumping station would be constructed at the east base of Guadalupe Mountain near the terminus of the existing tailings slurry line and a 3.5-mile pipeline extension would be constructed to transport the tailings slurry to the new impoundment.

An access road would be constructed approximately 60 feet wide and 1.5 miles long leading from the existing facility to the eastern edge of the saddle. In addition, a 20-foot wide patrol road would be required around the perimeter of the tailings pond and the dams. An electrical power distribution line would follow the proposed access road. Molycorp would tap the existing 69-kV transmission line on the western edge of the existing tailings facility and transmit 13.8-kV to the site via 40-foot "T" configuration wood distribution poles.

Any property developed as part of a mine operation, such as the Guadalupe tailings disposal area, is governed by safety regulations administered by the Mine Safety and Health Administration (MSHA). These regulations require safety equipment, special and general safety practices, as well as fire prevention and control. Any slash piles resulting from clearing activities would be burned in compliance with permits. Fire control equipment would be immediately available during burning activities. In addition, each vehicle operated by the mine is provided with a fire extinguisher as required by MSHA regulations. MSHA also requires fire-fighting equipment on the mine property to be strategically located, readily accessible, plainly marked, properly

maintained, and periodically inspected. Molycorp will comply with all applicable federal and state fire laws and regulations, and will take reasonable measures to prevent and suppress fires on the site.

All survey monuments would be protected as much as possible from unnecessary destruction. Any section corner that is destroyed by construction activity would be immediately reported to the BLM. To ensure that all section corners can be restored, witness corners would be located by a registered land surveyor outside of the project site.

Any archaeological and/or paleontological resources found on the project site would be recorded and recovered in cooperation with the BLM. Molycorp would continue to use all practicable methods to reduce the noise of equipment and protect employees from excessive noise levels.

Depending upon demand for molybdenum, construction would begin after approval of the Plan of Operations and would continue in stages throughout the life of the project. Construction would require a workforce of about 30, all employees of Molycorp or a contractor. Equipment would include standard earth-moving equipment such as a grader, bulldozer, haul truck, crusher, scraper, drill, and shovel.

1.3.2 Operation

Ore from the underground mine would be similar to that encountered in the open pit, therefore the milling process, including reagents, would not change. Reagents used in the mill include diesel, pine oil, methyl-isobutyl carbinol, Nokes reagent (a sulfide chemical compound), and Orfom, which replaced cyanide in the processing in 1983. Most of these reagents are molybdenum collectors, and the bulk of the reagents adhere to the molybdenum disulfide concentrate. Therefore, only trace amounts remain in the tailings.

During operation, the tailings would be transported as a slurry via Molycorp's existing tailings pipeline to the area of the existing impoundments, then through the pump station and up the slope to the Guadalupe Mountain impoundment. The slurry would consist of 60 percent by weight water and 40 percent solids. A chemical analysis of the tailings composition is presented in Table 1-2.

TABLE 1-2

TYPICAL ANALYSIS OF TAILINGS

	Dry Sample (in parts per million)
Aluminum (Al)	>10,000
Arsenic (As)	2.7
Barium (Ba)	740
Boron (B)	1.3
Cadmium (Cd)	0.3
Calcium (Ca)	>10,000
Chromium (Cr)	87
Cobalt (Co)	8.9
Copper (Cu)	94
Iron (Fe)	>10,000
Lead (Pb)	180
Magnesium (Mg)	10,000
Manganese (Mn)	490
Molybdenum (Mo)	130
Nickel (Ni)	5.6
Potassium (K)	>10,000
Selenium (Se)	4.7
Silver (Ag)	5.5
Sodium (Na)	10,000
Uranium (U)	2.3
Vanadium (V)	50
Zinc (Zn)	98
Chlorine (Cl)	24
Cyanide[1]	>0.4
Fluorine (F)	4,500
Silicon (Si)	>10,000
Sulfate (SO_4)	>1,000
Total Organic Carbon (TOC)	600

Source: Molycorp, Inc.

[1]Use of cyanide as a milling reagent was discontinued in 1983.

Tailings would be discharged around the perimeter of the pond in a manner to provide an even distribution of the tailings and to provide a central location for impounded water (clarification pond). The topography of the proposed tailings pond, as compared to the existing ponds, would allow for multiple, simultaneous discharge points which will increase the amount of beach area that can be kept wet, and consequently reduce the potential for fugitive dust emissions. At full development, the surface area of the tailings impoundment would be approximately 568 acres. Of this area, less than 200 acres would be dried tailings at any point in time. Dry areas of the tailings impoundment would be periodically sprayed with a chemically inert stabilizer (surfactant) to form a crust and reduce fugitive dust emissions. After the tailings solids settle out, the surface water and collected seepage from the dams would be transported via open, lined channel or pipeline to the existing ion-exchange plant where residual molybdenum would be removed prior to discharge to Pope Lake and the Red River. All discharges would be in accordance with Molycorp's National Pollution Discharge Elimination System (NPDES) Permit. Typical water quality of the current discharge into the Red River and current permit limits are shown in Table 1-3.

Natural drainage would be controlled by perimeter diversion ditches leading to existing arroyos. During operation of the tailings dams, monthly alignment and water level surveys will be performed and submitted to the State Engineer. The alignment survey will compare movement of permanent markers placed at various points on the dam face and throughout the impoundment. This survey will ensure that the movement does not exceed limits established by the stability analysis, which is part of the accepted design. The water level survey will provide information on the flow of water within the structure and will also ensure that the water level does not exceed the limits established by stability analysis.

A quarterly inspection report will also be developed and submitted to the State Engineer by a designated registered Professional Engineer. A review of the operational and construction activities will be included in the quarterly inspection report.

TABLE 1-3

TYPICAL WATER QUALITY DISCHARGED
FROM TAILINGS IMPOUNDMENT

Water Quality Parameter	Pope Lake Discharge		Seepage		NPDES Permit (Daily Maximum)	
pH	7.8		7.5		6.0 to 9.0	
Chemical Oxygen Demand	20	mg/l	6	mg/l	90	mg/l
Total Suspended Solids	10	mg/l	3	mg/l	30	mg/l
Cyanide[1]	>0.001	mg/l	>0.003	mg/l	0.05	mg/l
Fluoride	2.56	mg/l	2.10	mg/l	3.0	mg/l
Cadmium	0.01	mg/l	0.01	mg/l	0.15	mg/l
Iron	0.32	mg/l	0.21	mg/l	0.6	mg/l
Manganese	0.44	mg/l	1.1	mg/l	1.5	mg/l
Zinc	0.03	mg/l	0.03	mg/l	0.2	mg/l
Molybdenum	5.4	kg/day	5	kg/day	23	kg/day

Source: Molycorp, Inc.

[1]Use of cyanide as a milling agent was discontinued in 1983.

1.3.3 Closure

A closure plan must be approved by the State Engineer at the final stage of construction. The plan would describe specific measures to be taken to ensure long- term stability and to reclaim the site for future use. A final inspection would be performed by the State Engineer upon completion of work specified by the closure plan.

The Molycorp Tailings Disposal Facility is expected to operate for approximately 40 years, based on full-scale mining. At the end of the operating period, all surface facilities would be removed and disturbed areas would be reclaimed. Topsoil would be spread over the surface of the dried tailings to a minimum depth of 1 foot, and the area would be seeded with a mixture recommended by the BLM (see Vegetation under Section 3.15). Soils for capping the tailings would be taken from throughout suitable locations on Molycorp's property. Tree and shrub species would be planted within several years, or following establishment of the grasses.

1.4 Alternatives Considered but Eliminated from Detailed Analysis

In most EISs, the lead agency is required to consider and assess alternatives to a proposed action, i.e., No Action, alternate locations, and alternate methods of accomplishing the objectives of the proposed action. However, in the case of an action authorized under the mining laws, the BLM can only assess the impacts resulting from the proposed action, as described in the Plan of Operations, and must determine if the project meets BLM requirements for no unnecessary or undue degradation. There is no provision for a discussion of alternatives (43 CFR 3809 regulations). Consequently, this EIS will not address alternatives.

Prior to selecting the Guadalupe site, Molycorp undertook studies in 1974 to determine the most suitable location for additional tailings storage, with 15 potential sites investigated. An engineering feasibility study conducted in 1980 investigated eight sites in detail. As a result of these studies, the existing tailings ponds were expanded and the Guadalupe site was chosen for future development. The alternative sites considered are described, and their engineering and

environmental considerations discussed, in Molycorp's Plan of Operations. The other sites were eliminated from further study because they were determined to be unsuitable due to storage capacity, engineering feasibility, economic, or environmental limitations.

1.5 Regulatory Requirements

In accordance with BLM regulations for use of public land for mining purposes under the General Mining Laws (43 CFR 3809) and the implementing regulations (40 CFR 1505) for the National Environmental Policy Act (NEPA), BLM has prepared the EIS to determine if the proposed project would result in any unnecessary or undue degradation. If, after environmental analyses have been completed, it i determined that the proposal would not result in any unnecessary or undue degradation, then Molycorp's Plan of Operations must be approved [43 CFR 3809.1-6(a)(1)]. If it is determined that unnecessary or undue degradation would occur, then BLM must require conditions or mitigation measures as are necessary to ensure adequate environmental protection.

Following is a summary of major federal regulatory laws applicable to the Proposed Project.

- The General Mining Law of 1872, as amended, is the basic mining law governing the appropriation of federal mineral lands. It grants the right of an individual or company to use public land for mining and associated activities (e.g., milling or waste disposal). This is a statutory right granted by the U.S. Congress, and the BLM does not have the discretionary authority to deny these actions except where such actions would jeopardize a rare or endangered plant and/or animal species or would involve unnecessary or undue degradation of the environment. In these cases, denial of an action is also non-discretionary.

- The Mining and Mineral Policy Act of 1970 establishes the national policy of encouraging mineral development, especially strategic minerals, without undue hindrance.

- The Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701, et. seq.) amended the General Mining Law of 1872 to establish environmental protection requirements for any mining or mining-related activities on public land. Sections 302, 303, and 603 require the Secretary of the Interior to take any action, by regulation or otherwise, to prevent unnecessary or undue degradation of the federal lands, provide enforcement of those regulations, and to assure against pollution of streams and waters.

- The Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1280) established portions of the Rio Grande and Red River as instant rivers in Section 3 of the Act. The Wild and Scenic Rivers Act prohibits any federal agency or department from authorizing any water resources project (including the Proposed Project) that would have a direct and adverse effect on the values for which such river was established [Section 7(a)] and provides that regulations issued shall, among other things, provide safeguards against pollution of the rivers involved and unnecessary impairment of the scenery within the area designated for potential additions to, or an actual component of the national wild and scenic rivers system (Section 9). The values of the Rio Grande and Red River, for which they were established as wild and scenic rivers, include superior opportunities for outdoor recreational activity - sightseeing, camping, hiking, horseback riding, and nature study. Both rivers are also nationally renowned for their rainbow and brown trout fisheries.

- The Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661-666c) affects processes for federal approvals of water diversions and impoundments. The general purpose of the Coordination Act is to ensure that the authorizing agency give due consideration to fish and wildlife values and concerns prior to making an approval decision.

Currently, all wastes from the extraction, beneficiation, and processing of ores and minerals are conditionally excluded by the federal Resource Conservation and Recovery Act (RCRA), Section 3001 (b)(3)(A)(ii) from regulation as a hazardous waste under Subtitle C of RCRA. Thus, these mining wastes fall within the jurisdiction of Subtitle D of RCRA, which covers all solid wastes that are not regulated as hazardous wastes under Subtitle C.

In addition to approval of the Plan of Operations by BLM, other separate federal and state permits would also be required. Table 1-4 presents a summary of major federal and state permits and authorizations required for implementation of the Proposed Project.

Approval of Molycorp's Plan of Operations, including any required mitigation measures, would allow Molycorp to use federal lands associated with their mill site claims for construction and operation of the tailings disposal facility as discussed in this EIS. Under the General Mining Law, Molycorp would be allowed to file for patent of these lands at a future date. Patents, if they are applied for, would

TABLE 1-4

MAJOR PERMITS AND AUTHORIZING ACTIONS REQUIRED
FOR THE MOLYCORP TAILINGS DISPOSAL FACILITY

Agency	Required Permit or Authorization
Federal	
Bureau of Land Management (Coordinated with New Mexico - State Historic Preservation Office)	Approval of Plan of Operation Cultural Resources Mitigation Plan Section 106 Review
Fish and Wildlife Service	Compliance with Endangered Species Act Compliance with Eagle Protection Act Compliance with Fish and Wildlife Coordination Act [1]
Environmental Protection Agency	National Pollution Discharge Elimination System (NPDES) Permit
Department of Labor	Permit to Transport and Store Explosives
State	
State Historic Preservation Office (Coordinated with BLM)	Section 106 Review Cultural Resources Mitigation Plan
Environmental Improvement Division	Approval of Groundwater Discharge Plan
State Engineer	Permit Program for Construction, Operation, Maintenance, and Inspection of Dams

[1] The U.S. Fish and Wildlife Service has been sent a memo requesting a report as required under Section 2(b) of the Fish and Wildlife Coordination Act if they feel this project warrants a report. Recommendations from this report and other recommendations from U.S. Fish and Wildlife Service will be considered in developing mitigation in the Final EIS.

be prepared in the BLM state office. A patent would convey all title to the land from the BLM to Molycorp in fee simple. Application for patent is an entirely separate process from this EIS.

The possibility of filing an application for patent is at Molycorp's discretion since the law provides that an owner of a patented lode may file for an associated millsite that is to be used in connection with the lode. If the millsite claims were patented, the BLM would have no enforcement authority over the Plan of Operations; however, other regulatory agencies would control certain permits and monitoring related to the project as described in the previous paragraphs.

1.6 Issues and Concerns

Several issues or concerns related to the proposed project were identified as a result of the 1985 EA and during the scoping meetings that were held in July 1986 prior to preparation of the EIS. Additional discussion about the scoping meetings is presented in Section 4.0, Consultation and Coordination and Appendix A, Scoping Documentation. The primary issues that were identified as appropriate to be addressed in the Draft EIS included:

- potential effects to surface and groundwater quality (e.g., effects on well users, the Rio Grande, and the Arsenic Springs System; seepage considerations),
- air quality issues associated with windblown dust,
- potential health hazards associated with windblown dust,
- visual impacts of the dams,
- effects on local recreation/tourism,
- effects on the local employment/economy,
- noise effects, and
- loss of archaeological values.

The scoping process, as defined under the implementing regulations for NEPA (40 CFR Part 1501.7), is used not only to identify significant

environmental issues deserving of study, but also to deemphasize insignificant issues, thus narrowing the scope of the EIS process accordingly.

In December 1986, the BLM distributed a public information document to approximately 225 interested persons. The public information document included a detailed summary of scoping results, BLM responses to selected comments received during scoping, and the BLM Field Solicitor's opinion on concerns regarding future patenting of the Guadalupe site. These items are attached as Appendix A to the Draft EIS.

New issues that were identified during scoping resulted in the decision to include a discussion of health risks associated with inhalable silica and dust in the Draft EIS. It was also decided that additional data were required to assess impacts related with air quality, groundwater, and socioeconomic concerns. This additional data collection resulted in a delay in the original EIS schedule.

2.0 AFFECTED ENVIRONMENT

2.1 Introduction

This chapter describes the existing physical, biological, and social environment that would be affected by the proposed Molycorp project. Information summarized here was obtained from published sources including the EA (U.S.D.I. BLM 1985); consultants' reports for studies performed in connection with the existing and planned tailings facility; unpublished materials from site interviews with local, state, and federal agencies; and from site specific surveys of the proposed project location. The extent of the study area varies with different resources. For some resources such as vegetation and soils, the affected area was confined to the immediate area of the proposed tailings facility. For other resources, such as air and socioeconomics, a regional study area was delineated; these resources treat the affected environment in a regional context. The information in this chapter provides the basis for the assessment of impacts made in Chapter 3.

2.2 Air Quality and Meteorology

2.2.1 Climate

Questa is located against the western slope of the Sangre de Cristo range near the confluence of the Red River and Rio Grande. The climatology of the area is representative of a semi-arid location characterized by large annual variations in temperature and limited precipitation. No long-term temperature data are available from the site or immediate area, but meteorological data from an onsite monitoring program for the period November 1986 through July 1987 revealed a 9-month average temperature of 39.5°F. July was the warmest month with an average temperature of 65.2°F, whereas January was the coolest at 22.6°F. Table 2-1 presents a summary of temperatures for the 9-month period.

No precipitation data are available for Questa, but long-term data are available for Cerro, New Mexico, located 5 miles north of Questa. Table 2-2 summarizes these data. The region receives the majority of its precipitation in the spring and summer.

TABLE 2-1

MONTHLY TEMPERATURE SUMMARIES FOR THE GUADALUPE MOUNTAIN MONITORING SITE (°F)

	November 1986	December 1986	January 1987	February 1987	March 1987	April 1987	May 1987	June 1987	July 1987	9-Month Average
Average	32.4	24.5	22.6	27.7	31.0	41.7	49.5	61.3	65.2	39.5
Maximum	50.4	47.2	48.8	48.6	57.7	67.7	66.0	80.5	83.2	61.1
Minimum	7.4	-1.8	-4.7	4.5	-0.1	17.3	33.3	42.7	43.4	15.8

Source: ERT

TABLE 2-2

ANNUAL AVERAGE PRECIPITATION SUMMARY FOR CERRO, NEW MEXICO

(1931 - 1960)

Month	Precipitation (Inches)
January	0.64
February	0.60
March	0.58
April	0.97
May	1.34
June	0.87
July	1.70
August	1.92
September	1.43
October	1.19
November	0.61
December	0.61
Annual	12.46

Source: National Oceanic and Atmospheric Administration; Climates of the States, Volume 2.

Wind data from the Molycorp onsite meteorological monitoring study are summarized in Figure 2-1. These data show the observed frequency of winds by direction for the study area and indicate a strong predominance of northwesterly and southerly winds.

2.2.2 Air Quality

Present air quality at Questa can be defined using particulate data collected at the New Mexico Environmental Improvement Division (NMEID) monitoring site at Questa High School. Table 2-3 summarizes data collected from this site for the years 1979 through 1987. The Questa High School site is located along the northeast edge of the existing Molycorp tailings disposal area and is significantly impacted by windblown dust from the tailings during strong southwesterly winds. Observed annual means over the period ranged from 49 micrograms/cubic meter ($\mu g/m^3$) in 1981 to 18 $\mu g/m^3$ in 1986. The annual mean of 85 $\mu g/m^3$ in 1979 was based on only 9 samples and is therefore judged to be non-representative. Over this 9-year period, the New Mexico 24-hour standard of 150 $\mu g/m^3$ has been surpassed 10 times distributed over each year as follows: 1979 - 1, 1981 - 4, 1982 - 3, 1983 - 1, and 1984 - 1. During this same period the federal 24-hour standard of 260 $\mu g/m^3$ was surpassed 3 times, once each in 1981, 1982, and 1984. No exceedences of any standard have been observed in the last three years due to soils capping and improved pond management (e.g., application of surfactant). The New Mexico state and federal annual particulate standards have not been surpassed.

The area surrounding Questa has been designated as a Class II Prevention of Significant Deterioration (PSD) area. Class I areas are pristine areas such as national parks and national wilderness areas and are afforded stringent air quality protection. Class II PSD areas are allowed moderate deterioration of present conditions if they are in attainment status. Unless otherwise designated, all areas are Class II. The closest Class I area is the Wheeler Peak Wilderness located some 10 miles to the southeast.

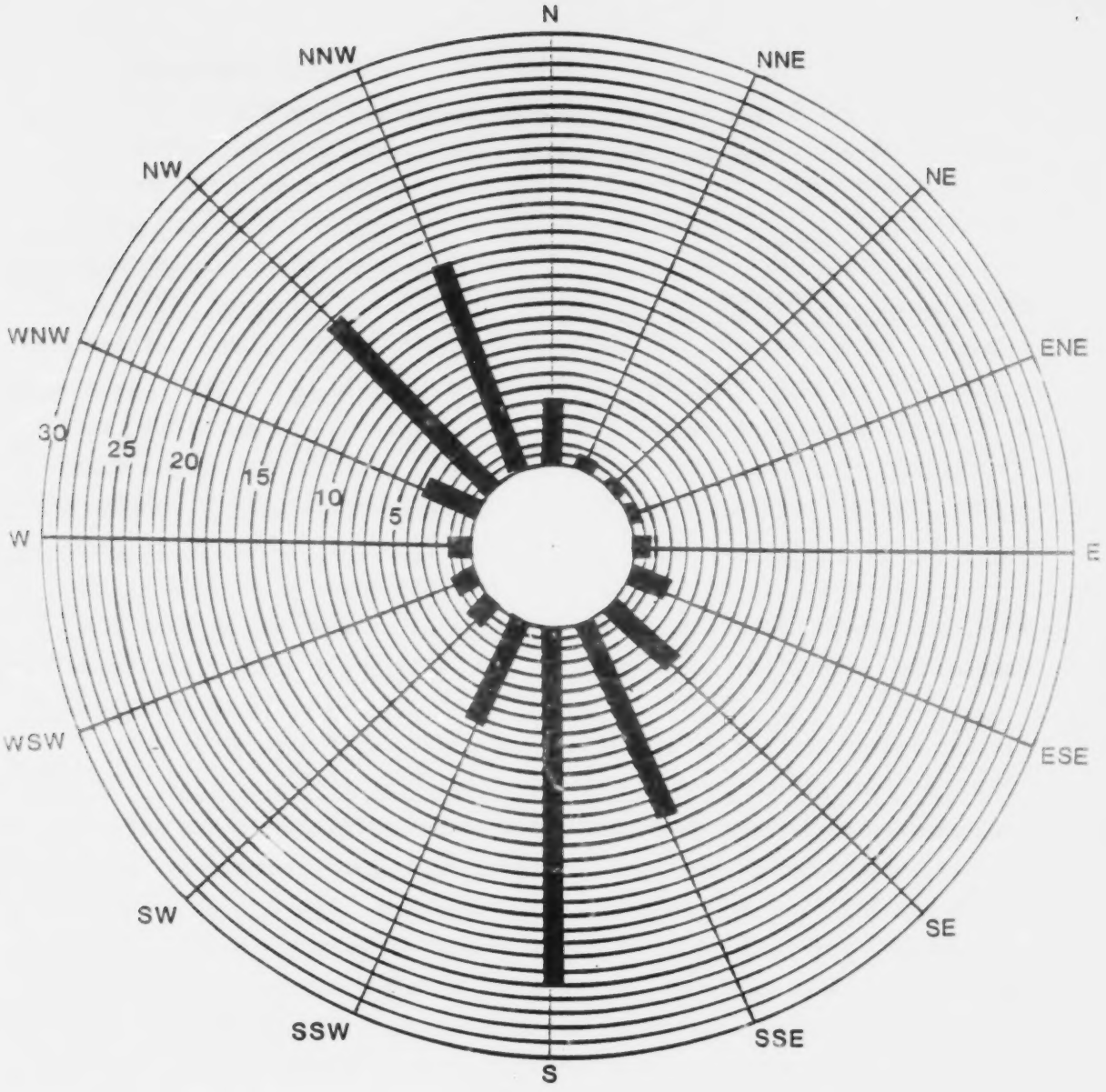


Figure 2-1 Windrose for Molycorp Guadalupe Mountain Monitoring Site
November 1986 Through July 1987

TABLE 2-3

TSP CONCENTRATION SUMMARIES FOR NMEID
(QUESTA HIGH SCHOOL) MONITORING SITE

Year	Number of Samples	Mean	Highest Concentration ($\mu g/m^3$)	Date	2nd Highest Concentration ($\mu g/m^3$)	Date
1979	9	85	216	6/18	145	7/3
1980	18	45	82	12/16	75	9/29
1981	54	49	399	2/21	180	1/22
1982	52	34	301	6/4	161	6/11
1983	48	38	186	11/2	136	5/31
1984	67	44	280	4/24	138	11/8
1985	37	36	119	8/23	83	1/22
1986	38	18	97	4/14	46	3/7
1987	49	22	80	4/27	75	5/21

Source: New Mexico Environmental Improvement Division

2.3 Topography/Geology

The proposed tailings disposal facility would be located in mountainous terrain in a broad, saddle-shaped valley situated between the two peaks of Guadalupe Mountain (Figure 1-1). These peaks rise to elevations of 8,763 feet and 8,722 feet for the northeast and southwest peaks, respectively. The long axis of the valley trends in a northwest-southeast direction and is flanked on the northeast and southwest by moderately steep (up to 30 percent gradient), well-dissected mountain slopes. The floor of the valley slopes gently (less than 5 percent) from about its center towards either end before it narrows abruptly to steep-sided arroyos that drain northwest to the Rio Grande plateau and southeast to the alluvial plain of the Sunshine Valley containing the existing Molycorp tailings facility. Local relief on the proposed facilities site is about 800 feet, with elevations varying from a low of 7,600 feet at the base of the planned decant collection dam to a high of about 8,400 feet along the valley sides on the quarry at maximum facilities development.

The study site lies within the confluence of the Rio Grande and Red River. Regionally, it is part of the Taos Plateau Volcanic Field (TPVF) and the Rio Grande rift zone. The TPVF is a high plateau region of gently eastward dipping flood basalts that are interbedded with and overlain by alluvial sediments (Dames & Moore 1986). The Rio Grande rift zone is a northeast-southwest trending depression from Socorro, New Mexico to the northern end of the San Luis Basin in southern Colorado. The rift zone consists of a series of structurally and topographically distant basins arranged in a "right-stepping echelon pattern" (Baltz 1978) from south to north. The study area is located in the southeast portion of the San Luis Basin, the most northern of the basins that make up the rift. The San Luis Basin is bounded on the east by the Sangre de Cristo Mountains. A series of north trending down-to-the-basin normal faults forms the boundary between the mountain range and the San Luis Basin. These faults are about 7 miles east of the study area.

The TPVF consists of several isolated volcanic features including the Guadalupe Mountain cone upon which the tailings facility is proposed to be located. Formation of Guadalupe Mountain during the late Miocene (3 to 15 million years ago) occurred by eruption of generally andesitic

to rhyodacitic structures. The andesite is highly fractured in all directions, however its permeability is unknown. Dacites erupted from a series of discrete vents, similar to the andesitic flows. The dacite flows occurred primarily during the late Tertiary (3 to 5 million years ago) and are described as fine-grained, irregularly jointed rock with poor crystalline structure. Permeability estimates for the dacites range from 10^{-6} to 10^{-4} centimeters/second; however, the anisotropic fracture permeability varies widely. Thickness ranges from 600 to 100 feet in the proposed tailings site (U.S.D.I. BLM 1985). The formation of the Rio Grande rift zone transpired concurrently with eruption of Guadalupe Mountain. While the rift zone and Guadalupe Mountain were believed to have been created by tectonic processes, seismic events at the present time are not considered to be of concern to the proposed tailings facility. Earthquake records have been of low incidence thereby placing the study area in a Seismic Risk Zone 1, minor damage expected (U.S.D.I. BLM 1985).

Flood basalts (the Servilleta basalt) began erupting during the onset of north-trending late Miocene faulting and continued until the late Quaternary (0.5 to 0.7 million years ago). The flood basalts interfinger complexly with the andesite and dacite flows while the younger flows overlap onto the mountain. These flood basalts are also inter-tongued with sedimentary rocks of the Santa Fe Formation derived from erosional material (sand, silt, weathered bedrock) from the Sangre de Cristo Mountains. Beneath the project site the basalt varies from 2 to 100 feet in thickness and is found at depths close to 1,000 feet (Dames & Moore 1986). Permeability estimates for the basalts range from 10^{-4} centimeters/second (under the proposed tailings pond) and 10^{-2} centimeters/second (between the west flank of Guadalupe Mountain and the Rio Grande Gorge) (U.S.D.I. BLM 1985). The basalt layers are characterized by a coarse-grained texture and extensive vertical and horizontal jointing. Total thickness of the volcanics and overlying sediments is greater than 5,000 feet. Alluvial sediment thickness is from 0 to 50 feet.

A major fault zone, which strikes northwest-southeast, exists approximately 2 miles southwest of Guadalupe Mountain. Vertical displacement of the fault in the basalts and alluvial sediments

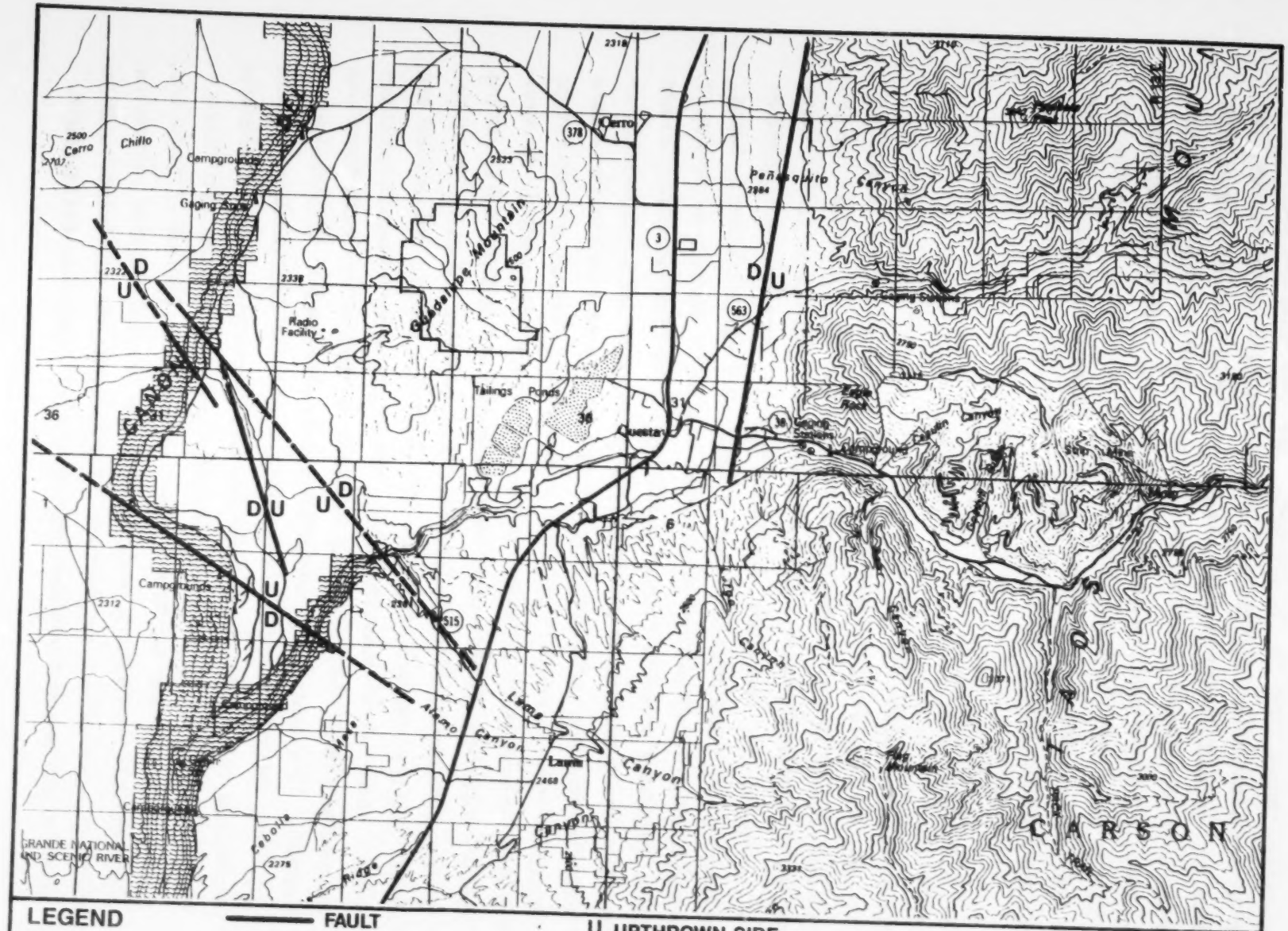
typically ranges from 30 to 100 feet. The post-faulting position of these two lithologies may deflect groundwater flow paths because of differing permeabilities (Menges 1984). One fault trace is mapped from about 1.75 miles south of Cerro gage to the vicinity of Red River fish hatchery. A major fault oriented north to south, exists approximately 2.5 miles east of Guadalupe Mountain, east of Questa. Evidence of several other faults exists in the confluence area of the Rio Grande and the Red River (Figure 2-2)(Dames & Moore 1986).

2.4 Water Resources

2.4.1 Surface Water

The two major river systems, the Rio Grande and the Red River, receive runoff in the project area from the perennial streams of the Sangre de Cristo Mountains. Some surface water recharge to these rivers is supplied by Guadalupe Mountain runoff; however, with limited precipitation (see Table 2-2) and a relatively small catchment basin, contribution from Guadalupe Mountain is minimal. Surface water runoff from Guadalupe Mountain occurs primarily during high intensity summer storms. Recharge is also provided from groundwater inflow from southern Colorado and from channeled deep groundwater systems within the area's volcanic rocks. Several springs along the Rio Grande and Red River provide groundwater recharge to these rivers. According to water quality data, flow measurement and radio-isotope dating, these spring waters probably come from groundwater sampled under Guadalupe Mountain. Water quality analyses of the spring water and the Rio Grande and Red River water were compared in a previous study (Water Resources Associates 1984) to determine whether a hydraulic connection was present. The analyses presented a strong correlation which indicates that the springs in the Red River that supply the fish hatchery and the accretions to the Red River below the fish hatchery have characteristics that are identical to those of the water in the Rio Grande near Cerro.

Rio Grande and Red River water is used for cold water fisheries, fish culture, livestock and wildlife watering, and for recreation. Table 2-4 presents a comparison of data from the Rio Grande and Red River to the New Mexico Water Quality Control Commission Standards.



Source: Dames and Moore, 1986.

FIGURE 2-2 FAULT LOCATIONS WITHIN THE STUDY AREA VICINITY

TABLE 2-4

WATER QUALITY OF RIO GRANDE AND RED RIVER[1]

Parameter	Rio Grande Near Cerro	Red River[2] Below Questa	Red River Above[3] Fish Hatchery
Temperature (degrees Celsius)	11.1(51)	8.9(64)	9.5(54)
pH, field (median value)	8.2(49)	7.6(59)	7.9(51)
Sediment suspended (mg/l)	40.4(31)	201(45)	134(33)
Specific Conductance (μmhos)	233(51)	258(61)	403(53)
Hardness (mg/l as $CaCO_3$)	75(28)	117(32)	216(29)
Cadmium total (μg/l)	0.15(37)	0.64(43)	0.39(39)
Copper total (μg/l)	4.9(23)	25.2(29)	23.4(24)
Cyanide total (μg/l)	0.00(15)	0.04(18)	0.01(18)
Iron dissolved (μg/l)	66.2(45)	27.7(42)	17.7(32)
Sulfate dissolved (μg/l)	36.2(24)	78.2(27)	196(24)
Manganese dissolved (μg/l)	14.9(43)	361.3(49)	252.3(48)
Molybdenum total (μg/l)	5.1(33)	12.7(56)	156.4(53)
Nitrogen total (mg/l)	0.97(28)	0.59(32)	0.69(28)
Phosphorus total (mg/l)	0.12(28)	0.11(35)	0.06(28)
Zinc total (μg/l)	31.7(44)	121.0(58)	73.9(53)
Total Organic Carbon (mg/l)	5.06(44)	3.51(51)	2.49(42)

[1]Average of values for selected parameters, collected by the BLM, analyzed by the U.S. Geological Survey (Denver) from October 1978 to December 1986. Number of samples is in parentheses.

[2]Station located 1 mile above existing tailings discharge point.

[3]Station located 0.5 mile below existing tailings discharge point.

2.4.2 Groundwater

Groundwater is found in valley fill sediments derived from the Sangre de Cristo Mountains, in volcanic rocks found interbedded within and underlying the valley fill sediments, and in the Santa Fe Formation. Recharge to the groundwater systems in the Guadalupe Mountain vicinity results primarily from mountain runoff occurring in the Sangre de Cristo Mountains and to a lesser extent from precipitation occurring in the Guadalupe Mountain complex. This runoff infiltrates into the valley fill sediments and moves downward where it enters the interfingered and underlying volcanic rocks that join the sediments from the west. A description of geologic units is found in Section 2.3 of the Draft EIS. Groundwater flows west-southwest through both the sediments and the volcanics, eventually discharging to the Rio Grande and Red Rivers, which are regional line sinks draining the general Guadalupe Mountain area (Winograd 1959; Summers and Hargis 1984; Winograd 1985).

In the general vicinity of Guadalupe Mountain, groundwater flows south-southwest through dacite and olivine andesite flows of the Guadalupe Mountain complex and the sedimentary Santa Fe Formation (Dames & Moore 1988). The Red River Fault Zone bisects the area along the southwestern toe of the Guadalupe Mountain complex. West of the fault zone, the Santa Fe Formation has been uplifted, and the water table is below the volcanics and in the Santa Fe Formation (see Dames & Moore 1987). An exception to this condition can be found in the Big Arsenic Springs area where a lobate dacite flow followed and filled a paleo valley (possibly an ancestral Red River Valley) at a depth that is now a few hundred feet below the top of the Santa Fe sediments. East of the Red River Fault zone, the rock units are down-dropped several hundred feet relative to that west of the zone. As a result, the volcanics comprise an aquifer of high conductivity in this area.

The Santa Fe Formation underlying the volcanics has a lower hydraulic conductivity than the overlying volcanics and acts as an aquitard restricting groundwater flow from volcanic aquifers east of the fault zone to the Rio Grande and to the lower 2 miles of Red River (Dames & Moore 1988). An exception is the dacite-filled paleo valley

within the Santa Fe Formation that crops out at the Big Arsenic Springs along the Rio Grande River Gorge. The dacite has a relatively high permeability and appears to be an avenue of higher flow through the Santa Fe Formation.

The Servilleta basalts extend from near ground surface to a depth of a few hundred feet over much of the plateau area west of Guadalupe Mountain and along the Rio Grande and Red River gorges. The Servilleta Basalts are generally located above the water table west of the Red River Fault Zone and have little or no influence on the groundwater flow in this area (Dames & Moore 1988).

Fifteen monitor and water supply wells were used to collect data on groundwater characteristics in the Guadalupe Mountain area. Locations of these wells are shown in Figure 2-3. Depth to groundwater beneath the proposed tailings disposal facility was determined to be 785 feet. The groundwater gradient beneath Guadalupe Mountain is on the order of 200 feet per mile based on water level data from five monitor wells (Dames & Moore 1986). A calculated hydraulic conductivity value for the deep aquifer is 2,400 feet per day (Dames & Moore 1988). Analysis of existing USGS data by Dames & Moore (1987), indicated that a substantial amount of groundwater flows under the proposed tailings pond site. It was concluded that an average groundwater flux of at least 50 cubic feet per second (cfs) occurs across a 5-mile distance along a line from Cerro Chiflo to the head of the Red River Canyon.

Dames & Moore sampled 10 springs and wells in 1983 and 1985 to characterize the ambient groundwater quality. Table 2-5 represents an average ambient groundwater quality for the Rio Grande and Red River areas combined. All average groundwater parameter values were less than the maximum allowable concentration as provided in the New Mexico State groundwater standards (Dames & Moore 1987). However, when reviewed individually, certain groundwater quality samples exceeded the maximum allowable State standards on a number of occasions as shown in Table 2-6. Cadmium and lead levels exceeded maximum allowable concentrations at the BLM headquarters (HDQ) sampling locations and at the Fish Hatchery Spring No. 1. Iron and manganese levels were significantly exceeded at the Fish Hatchery Spring No. 1 for all months in 1985 (Dames & Moore 1987).

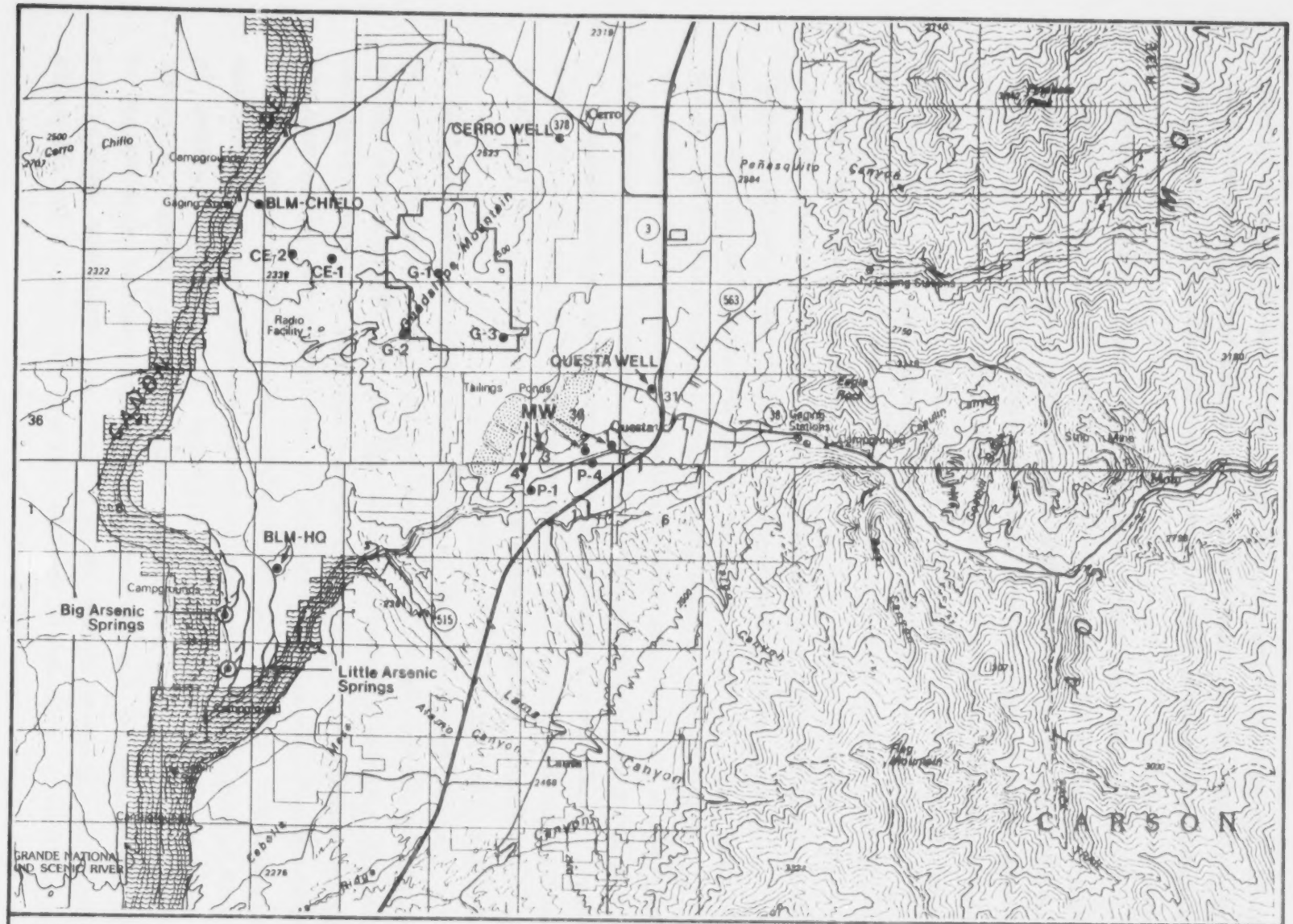


FIGURE 2-3 MONITORING WELL LOCATIONS

TABLE 2-5

MEAN WATER QUALITY OF AMBIENT GROUNDWATER COMPARED TO NEW MEXICO GROUNDWATER STANDARDS

Parameter	New Mexico Groundwater Standards	Ambient Groundwater Quality[1]
pH	9	8.04
COD	—	ND
TSS	—	31.00
TDS	1,000	198.22
CN	0.2	ND
F	1.6	0.99
Cd	0.01	0.002
Fe	1.0	0.60
Mn	0.2	0.18
Mo	1.0	0.06
Zn	10.0	0.19
Pb	0.05	0.02
Cu	1.0	0.018
As	0.1	ND
Hg	0.002	0.0001
SO_4	600	38.92
Ba	1.0	ND
Cr	0.05	0.01
Ni	0.2	0.03
Ca	—	22.21
Ag	0.05	ND
Cl	250	8.90
Al	5	ND
Mg	—	6.72

Source: Dames & Moore 1987.

ND = Below detection limit.

— = No standard.

[1] Rio Grande and Red River Springs and 2 wells (10 locations).

TABLE 2-6

MONTHLY MEANS OF AMBIENT GROUNDWATER QUALITY VALUES EXCEEDING OR EQUIVALENT TO NEW MEXICO STATE GROUNDWATER STANDARDS (IN PARTS PER MILLION)

Location	Date	Cadmium	Iron	Manganese	Lead
BLM Headquarters Well (BLM-HDQ)	05/85	0.01			0.05
Red River Fish Hatchery Spring No. 1	12/84		2.94	0.48	0.05
	01/85			0.34	
	02/85	0.01		0.45	0.06
	03/85	0.01		0.46	0.05
	04/85	0.01	1.99	0.54	0.07
	05/85		2.6	0.48	
	06/85		4.2	0.34	0.07
	07/85	0.01	2.9	0.25	
	08/85			0.24	
	09/85	0.01	2.4	0.7	
	10/85	0.01	4.03	0.66	
New Mexico State Drinking Water Quality Standards		0.01	1.0	0.2	0.05

Source: Dames & Moore 1987.

The deep aquifer in the Guadalupe Mountain area is a source of water supply for the BLM visitor center (3 miles southwest of the proposed site). The City of Questa is supplied by town groundwater wells which are north and east of Questa and are upgradient from the proposed tailings facility.

2.5 Soils

Soils on the Guadalupe site are of basaltic and mixed alluvial origin derived from the volcanic basalts of the mountain. There are two major soil units represented on the site: the Fernando-Hernandez association and the Rock Outcrop-Raton complex (see Figure 2-4). One other soil unit, the Fernando cobbly loam, occurs near the southeast border of the study area (U.S.D.A. SCS 1982). These soils are divided primarily by steepness of the slope, depth, and stage of development through the soil profile.

The Fernando-Hernandez association (FHB)occurs on the nearly level portion of the site along the center portion of the saddle valley and covers about 8 percent of the study area or about 14 percent of the proposed facilities area. The Fernando soil is deep and well-drained alluvium with textures ranging from clay loam at the surface to silt loam in the substratum. The available water capacity is high. Runoff is slow, and the erosion potential is moderate. The Hernandez soil is a deep and well-drained mixed alluvium with loam to clay loam textures. Water capacity and erosion potential is similar to that of the Fernando soil. Runoff is medium (U.S.D.A. SCS 1982). Both soils are notably calcareous. Inclusions of Tenorio, Silva, and Sedillo soils are present in this soil association.

A small area of the Fernando cobbly loam soil type (FaC) occurs in the southeast corner of the study area and accounts for about 47 acres (4 percent) of the 1,230-acre area. This is a deep, well-drained, nearly level to moderately sloping soil on alluvial fans at the base of mountains or cones (U.S.D.A. SCS 1982). It is formed in mixed alluvium. The surface layer is typically cobbly loam about 3 inches deep. The subsoil is a brown loam and clay loam to a depth of about 2 feet with a

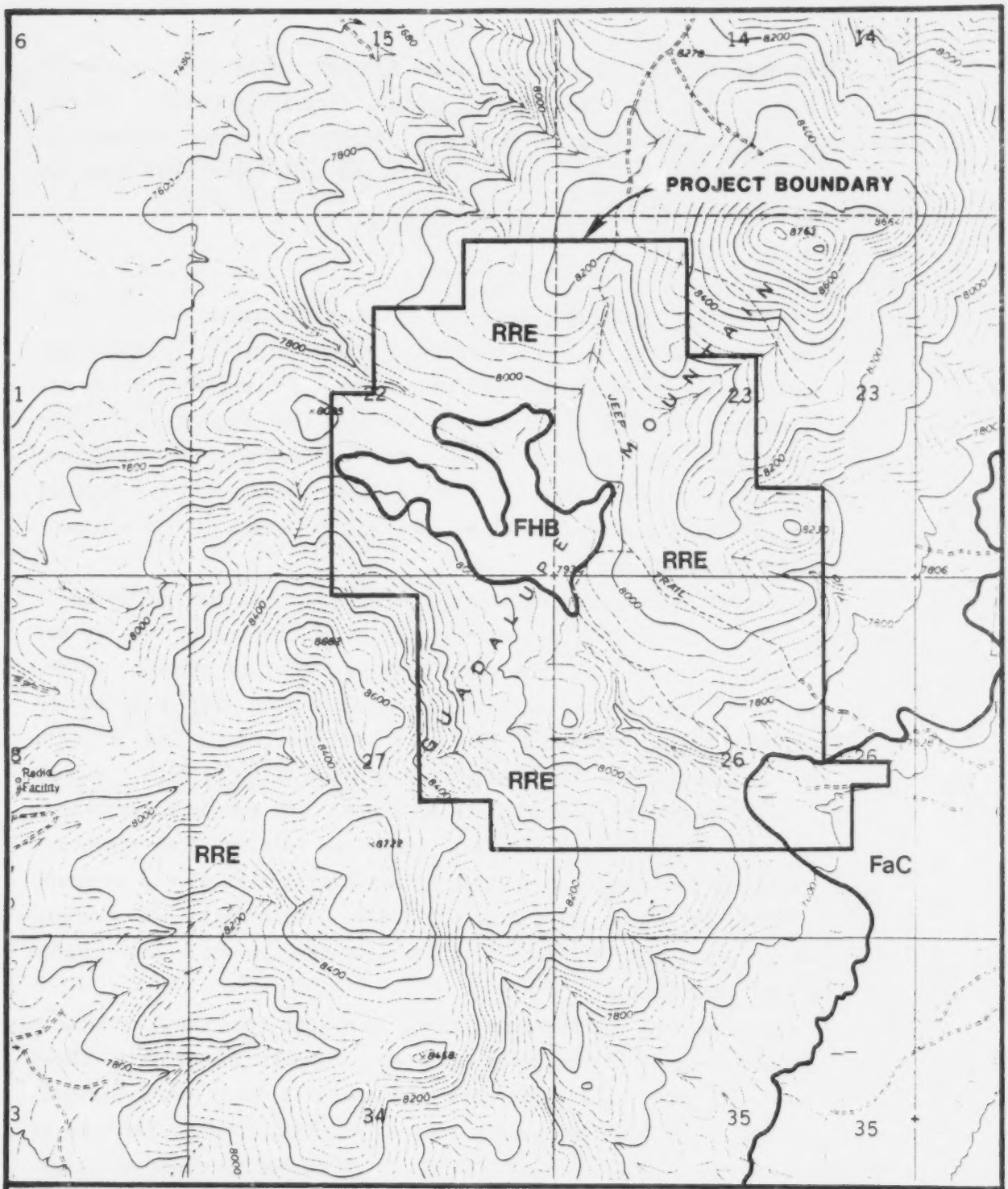


FIGURE 2-4 SOILS IN THE VICINITY OF THE PROPOSED MOLYCORP TAILINGS POND

comparable substratum to 60 inches or more. The available water capacity is high with an effective rooting depth of 60 inches or more. Erosion potential is slight to moderate (U.S.D.A. SCS 1982).

The remainder of the study area (approximately 88 percent) is covered by the Rock Outcrop-Raton complex on moderately steep slopes and is composed of the exposed basalts intermixed with shallow, rocky soils. The rock outcrops consist of the exposed basalt flows and are characterized by rapid runoff. The Raton soil type is shallow and well-mixed, formed as a residuum of the basalts and mixed eolian sediment. Depth to bedrock averages 18 inches. This shallow soil is well drained and slowly permeable. Soil texture ranges from very stony silt loam on the surface to a very stony clay subsoil. The available water capacity is very low, and runoff is rapid. The effective rooting depth is 10 to 20 inches (U.S.D.A. SCS 1982). Orthents and Stunner soils can make up approximately 15 percent of this complex.

Soil data interpretations indicate that native soil material that may be categorized as suitable for salvage include the Fernando and Hernandez soils which have favorable textures and depth for salvage. In general, the remaining soils in the facilities area are too shallow or rocky to be suitable for salvage. The Fernando cobbly loam soils of the southeastern corner of the study area will not be substantially disturbed by project construction.

2.6 Vegetation

Vegetation in the region of the Guadalupe site study area is typical of the High Intermountain Plateau of northern New Mexico. Soils and associated climatic factors support vegetative communities similar to those of the Great Basin Desert Shrub Formation and include big sagebrush, western wheatgrass/big sagebrush, and pinyon-juniper/big sagebrush at lower elevations and ponderosa pine/Douglas-fir associations at higher elevations (U.S.D.A. SCS 1982).

Detailed studies of vegetative communities and delineation of wildlife habitats were conducted by Eagle Environmental during 1984 as part of a special study of the Guadalupe Mountain area performed under BLM contract (Kennedy and Stahlecker 1986). Within the 1,230-acre study area there are three primary vegetation types: pinyon-juniper

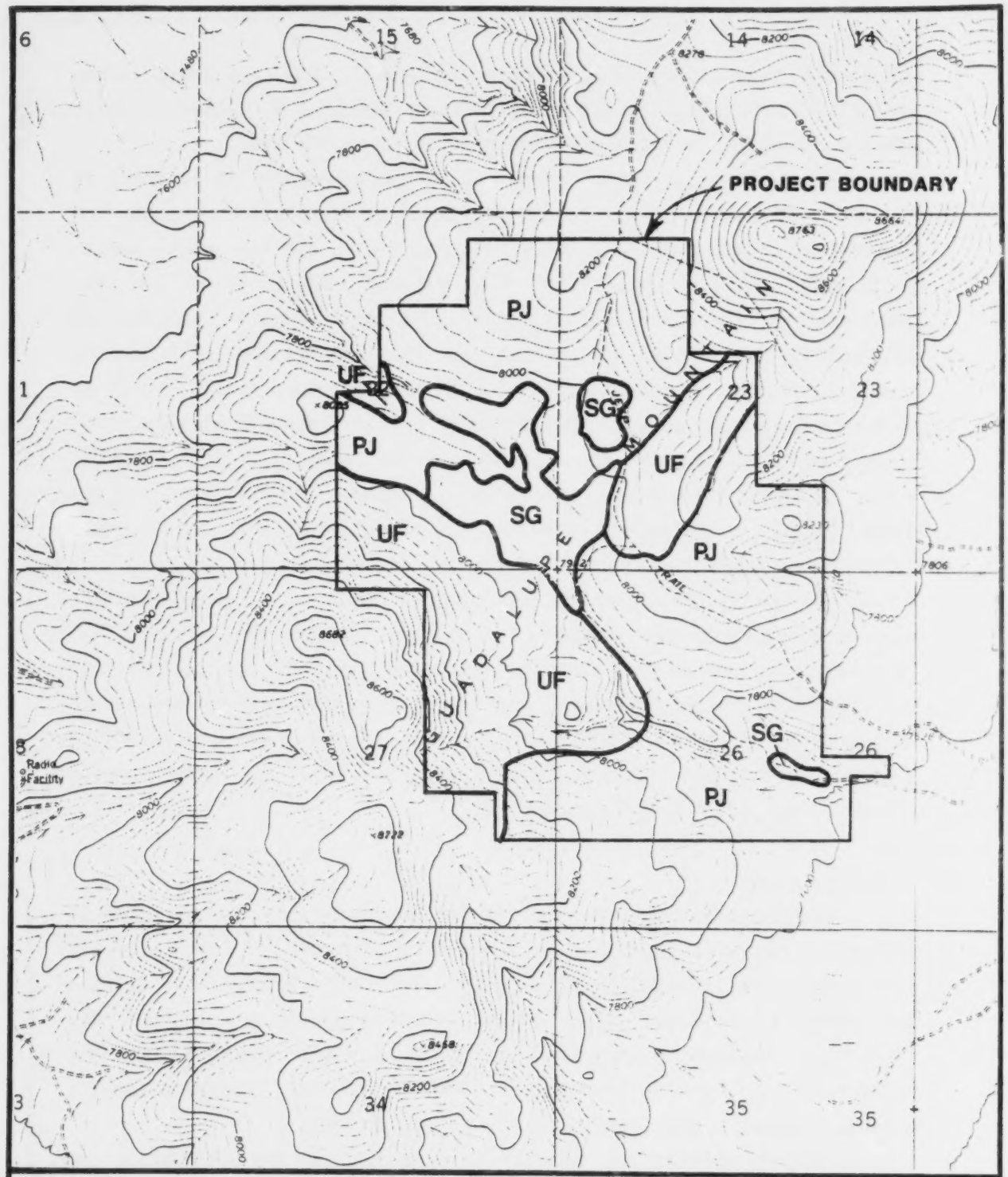


FIGURE 2-5 VEGETATION TYPES IN THE AREA OF THE PROPOSED MOLYCORP TAILINGS POND

woodland, upland forest and sagebrush/grassland; a small area designated as agricultural is located in the southeast corner of the area adjacent to the existing tailings facility (Figure 2-5). Table 2-7 provides a summary of each site vegetation type, its relative extent, dominant woody species, average density, and average heights based on data collected within the study area and immediate vicinity. Each of the vegetation types are described briefly below:

- Pinyon-Juniper Woodland. The pinyon-juniper vegetation type is the most extensive community on the study area occupying about 62 percent of the area. It occupies well drained slopes with shallow, rocky soils of the Rock Outcrop-Raton complex. This habitat dominates the lower slopes of Guadalupe Mountain and grades into the upland forest conifers at higher elevations and on north-facing slopes. Pinyon-juniper typically supports a very dense growth of pinyon pine and juniper tree species with a less well-developed understory. This type was found to have a canopy cover of up to 75 percent in some areas and had the highest vegetative diversity of any of the vegetation communities in the area (Kennedy and Stahlecker 1986). Dominant understory species include big sagebrush, which is common, and mountain mahogany, which occurs in greater numbers at higher elevations. Grasses, including blue grama, western wheatgrass, galleta, Indian ricegrass, and bluebunch wheatgrass are major species of the sparse ground cover.

- Upland Forest. The upland forest type occurs on the higher slopes of the study area and occupies the mountaintops and strongly sloping to very steep slopes, particularly those with a north-facing aspect. It occurs on about 27 percent of the study area. As for the pinyon-juniper type, the upland forest exists on soils of the Rock Outcrop-Raton complex, differing slightly in that it occupies the cooler, moister sites. The community is characterized by a mixed conifer overstory composed of pinyon pine, junipers, ponderosa pine, and Douglas fir. A wide variety of shrub species occur in this community including big sagebrush, mountain mahogany, snowberry, snakeweed, and Gambel oak. Grasses and forbs are sparse, consisting primarily of mountain muhly and brome grass (Kennedy and Stahlecker 1986).

- Sagebrush/Grassland. The sagebrush/grassland type is concentrated in the center of the study area and proposed tailings facility. It primarily occupies the level to gently sloping soils of the Fernando-Hernandez association, characterized by deep, well-drained mixed alluvium. Big sagebrush is the most common shrub present with associated woody species including rabbit brush, broom snakeweed, and

TABLE 2-7

VEGETATION COMMUNITY DATA SUMMARY

Vegetation Type	Acreage (Within the Project Boundary)	Relative Percent	Dominant Woody Species	Average Density (No./Acre)	Average Height (Feet)
Pinyon-Juniper Woodland	759	62	Pinyon Pine	817	7.6
			Juniper	100	7.2
			Big Sagebrush	1,067	1.0
Upland Forest	338	27	Pinyon Pine	158	11.6
			Juniper	242	8.0
			Douglas Fir	158	11.2
			Ponderosa Pine	33	16.5
			Mountain Mahogany	83	3.7
Sagebrush/Grassland	111	9	Big Sagebrush	5,530	1.3
			Broom Snakeweed	210	<1.0
			Pinyon Pine	33	<1.0
			Rubber Rabbitbrush	33	<1.0
Agriculture (Fallow Fields)	22	2	Rubber Rabbitbrush	17	3.0
			Big Sagebrush	100	<1.0
Total	1,230				

Source: Kennedy and Stahlecker 1986

scattered pinyon pine. Common grasses are blue grama, western wheatgrass, needle-and-thread, and Indian ricegrass (U.S.D.I. BLM 1985). This type occupies approximately 9 percent of the study area.

A thorough threatened and endangered plant inventory of the study area was completed in 1984. No threatened and endangered plants were encountered during this survey (U.S.D.I. BLM 1985).

2.7 Wildlife

2.7.1 Aquatic

No aquatic resources are present on the proposed facility site. Water is currently available onsite from an inverted umbrella-type water catchment, providing water resources for wildlife species within an approximate 5-mile radius (Kuykendall 1988) and a small, gully plug reservoir which holds water for a short period after rains. In addition, the Big Arsenic and Little Arsenic Springs systems, located approximately 4 miles downgradient from the proposed site along the Rio Grande (see Figure 2-3), are considered important high quality tributaries to the Rio Grande and unique habitat for both aquatic and terrestrial organisms (U.S.D.I. BLM 1985). Both spring systems flow 25 to 50 feet above the eastern bank of the Rio Grande. An investigation of the aquatic organisms that inhabit the spring complexes has been completed, and a preliminary list of the benthic macroinvertebrates reported is provided in Appendix B. The overall water temperature consistency, flow stability, and water quality of the springs support a diverse aquatic invertebrae community providing a stable food source for fish in the Rio Grande.

The Rio Grande Gorge is located 2 miles west of the proposed project facility (see Figure 2-3), and the confluence of the Rio Grande and Red River is about 5 miles southwest of the site. These rivers support numerous aquatic species. Game fish include rainbow and brown trout, smallmouth bass, northern pike, and channel catfish. The Rio Grande cutthroat trout is native to these rivers and may be present in limited numbers or may be known to hybridize with rainbow trout

(Sandoval 1988; Kuykendall 1988). Other fish species that occur in this area include the Rio Grande sucker, carp, fathead minnow, longnose dace, and Rio Grande chub (U.S.D.I. BLM 1985).

2.7.2 Terrestrial

The proposed 1,230-acre tailings disposal site would be located within three primary vegetation types: pinyon-juniper woodland, upland forest, and sagebrush/grassland. The site contains a variety of vegetation species (see Section 2.6), affording quality cover and forage for many wildlife species.

A variety of mammals, birds, reptiles, and amphibians are associated with the project area. Game mammals or furbearers that may typically occur near the proposed tailings site include mule deer, elk, cottontail, bobcat, coyote, gray fox, raccoon, ringtail, mountain lion, and black bear. Mule deer occur year-round throughout most of the project area and comprise a stable population. The north aspect of the Guadalupe Mountain saddle provides optimal deer browse within the resource area; however, the area is not classified as mule deer critical winter range (Kuykendall 1988). Elk are also present in the area. A small resident population has grown steadily within the past several years, with an increase in reported observations. Optimal thermal cover for both winter and summer conditions occurs primarily in the area of the south edge of the proposed west dam (Kuykendall 1988).

Bobcat, coyote, gray fox, raccoon, and ringtail are all found within the project area. Bobcat, gray fox, and ringtail distribution would be intermittent in wooded and brushy areas surrounding the proposed facility site (Findley et al. 1975). The coyote is the most common medium-sized mammal found throughout the study area, and the raccoon would be expected along the the Rio Grande and Red River. Mountain lion and black bear occur in limited numbers in mountainous area and have been reported in the area surrounding Guadalupe Mountain (U.S.D.I. BLM 1987).

Numerous non-game or small-sized mammal species may occur onsite. Small mammal productivity varies considerably year-to-year, depending

upon habitat conditions and reproductive success. Small-sized mammal species on or near the project site include the whitetailed jackrabbit, Ord's kangaroo rat, deer mouse, and least chipmunk (U.S.D.I. BLM 1985).

Guadalupe Mountain and associated areas, including the adjacent riverine systems, support a broad diversity of both migrant and nesting bird species. Kennedy and Stahlecker (1986) recorded 133 avian species within the Guadalupe Mountain study area, which encompasses the proposed facility site, during their 1984 and 1985 studies. Additional bird species also occur within the project area (U.S.D.I. BLM 1985). Upland game birds could include the mourning dove, scaled quail, Merriam's turkey, bandtailed pigeon, and blue grouse. Waterfowl and shore birds utilize the riverine system as well as the existing impoundment areas. Common nesting species include the common merganser and mallard. Canada geese also nest in the upper Rio Grande Gorge (U.S.D.I. BLM 1987). The upper gorge provides significant habitat for raptor species. Table 2-8 lists raptors potentially occurring on or near the Guadalupe Mountain site. Verified nesting species on the site include the great-horned owl, saw-whet owl, red-tailed hawk, and American kestrel (U.S.D.I. BLM 1987).

Amphibians and reptiles typically found near the study area include the western spadefoot toad, leopard frog, collared lizard, great plains skink, bull snake, and prairie rattlesnake.

Wildlife species of concern either occurring within or adjacent to the project region or those species with a potential for occurring in the area include the bald eagle, American peregrine falcon, and whooping crane. The bald eagle is federally-listed as endangered in the conterminous United States, except for several northwest and Great Lake states, where it is listed as threatened (U.S.D.I. FWS 1987) and listed by the state of New Mexico as endangered (group 2). An estimated 350 bald eagles were recorded in New Mexico in 1982 during the mid-winter period. Within the Rio Grande Gorge in the vicinity of Guadalupe Mountain, the unique habitat supports approximately eight wintering eagles from December to March (U.S.D.I. FWS 1983, Kuykendall 1988) and incorporates a combination of cottonwood and willows, which are utilized extensively by the wintering eagles. Bald eagles feed mainly on fish and waterbirds near rivers, lakes, and reservoirs and feed to a lesser

TABLE 2-8

POTENTIAL RAPTOR OCCURRENCE ON OR NEAR
THE GUADALUPE MOUNTAIN SITE

Species	Season of Use
Goshawk	migrant
Sharp-shinned hawk	summer
Cooper's hawk	yearlong
Red-tailed hawk	yearlong
Swainson hawk	spring and summer
Rough-legged hawk	migrant/winter
Ferruginous hawk	yearlong
Golden eagle	yearlong
Bald eagle	migrant/winter
Osprey	migrant/summer
Prairie falcon	yearlong
Peregrine falcon	yearlong
Merlin	migrant
American kestrel	yearlong
Marsh hawk	migrant/winter
Barn owl	summer
Screech owl	winter
Great-horned owl	yearlong
Saw-whet owl	yearlong

Source: U.S.D.I. BLM 1985

extent on carrion and small prey species. The project site has not been shown to directly support bald eagles; however, an occasional individual may utilize the project area during foraging activities.

The American peregrine falcon is federally-listed as endangered (U.S.D.I. FWS 1987) and state-listed as endangered (group 1). The peregrine was formerly widespread throughout North American and now exists as a breeding bird only in disjunct populations, including locations in the southern Rocky Mountains (U.S.D.I. FWS 1983). The proposed project site is located within the anticipated hunting range of a peregrine eyrie. The eyrie has historically been utilized by breeding peregrines and is currently active (Kuykendall 1988). Reproduction from these birds is considered successful. Predominant prey items for the peregrine falcon are bird species representative of forest and riparian communities (U.S.D.I. FWS 1983).

The whooping crane is federally-listed as endangered, state-listed as endangered (group 2), and may potentially pass through the project area during migration. Crane presence near the Guadalupe Mountain site would likely be limited to overflights only (U.S.D.I. BLM 1985).

Other sensitive raptor species that may potentially forage within the project area include the ferruginous hawk, a yearlong resident, and the Swainson's hawk, a spring and summer resident. Both species are listed as federal candidate species - Category 2. This designation indicates that the species are proposed for federal listing as threatened or endangered; however, conclusive data on biological vulnerability and threat are not currently available to support these proposed rules (U.S.D.I. FWS 1985). In addition, the mountain plover and white-faced ibis have been reported in the project area (Kuykendall 1988, Kennedy and Stahlecker 1986). Both species are also listed as federal candidate species - Category 2. The occurrence of these species is considered rare, however, and individuals would not likely utilize the project site.

2.8 Land Use (including prime farmland and grazing)

2.8.1 Land Status and Land Use Plans

The proposed Molycorp tailings disposal facility site is located in Taos County, New Mexico on public lands administered by the BLM. Current use of the land is dominated by dispersed recreation, livestock grazing, and open space. Management of the area is addressed in the proposed Taos Resource Management Plan (U.S.D.I. BLM 1987).

The proposed site would become private land if the existing claims are patented (U.S.D.I. BLM 1987). Taos County does not currently have an adopted land use plan or zoning ordinance (Quintana 1988). The county is in the process of preparing a draft land use plan which will address the issue of private land development. Completion of a draft land use plan was anticipated by the Fall of 1988 (Quintana 1988); however, this effort has been placed on hold at this time (Cisneros 1988).

2.8.2 Prime and Unique Farmland

There is no prime or unique farmland on the project site. The nearest prime farmland is approximately 1 to 2 miles to the northeast of the proposed site (U.S.D.I. BLM 1985; Yonemoto 1988).

2.8.3 Livestock Grazing

The proposed Molycorp tailings site is located in the Northern Management Unit for livestock grazing. The permittees in this unit depend on public land for a great deal of their livestock pasturage. The Molycorp study area provides a total of approximately 69 Animal Unit Months (AUMs) per year. The primary use is for cattle during the spring, early summer, or fall use period. In most cases, the season of use is closely integrated with the entire livestock business on an annual scheduling basis (U.S.D.I. BLM 1985; Yonemoto 1988). Allotment 608 is currently being leased by one permittee. Allotment 609 has not been leased for two years.

Within the proposed site are two range improvements (as authorized under Section 4 of the Taylor Grazing Act of 1934), an earthen livestock reservoir that was constructed in 1977 (U.S.D.I. BLM 1985) and an inverted umbrella watering device.

2.9 Recreation

The proposed Molycorp tailings site is adjacent to and nearly surrounded by the Wild Rivers Recreation Area Special Management Area (SMA), as recommended by the BLM in the proposed Taos Resource Management Plan (RMP)(October 1987). The recommendation in the RMP specifically excludes the proposed Molycorp tailings site from the SMA as shown in Figure 2-6. The Wild Rivers Recreation Area SMA is made up of the Wild Rivers Recreation Area (previously called the Rio Grande Recreation Area) and the proposed Guadalupe Mountain Area of Critical Environmental Concern (ACEC). The total SMA consists of 20,310 acres.

The Wild Rivers Recreation Area SMA is located at the confluence of the Rio Grande and Red Rivers. The SMA contains a portion of the Rio Grande Wild and Scenic River, which was one of the first eight rivers federally designated on October 2, 1968 for inclusion in the "Wild and Scenic Rivers Act" (Public Law 90-542). In this Act, the U.S. Congress declared it "to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations".

The 48 miles of the Rio Grande from the Colorado/New Mexico border, south to Taos Junction, New Mexico, and the lower 3.25 miles of the Red River are classified and administered as a "Wild River". The upper 0.75 mile within the lower 4 miles of the Red River is classified and administered as a "Recreational River" due to its accessibility (BLM 1984). Both corridors include a 0.25-mile buffer on either side of the Rio Grande and Red Rivers.

The 1,880-acre Wild Rivers Recreation Area (formerly the Rio Grande Recreation Area) was developed following this designation. The recreation area is used by visitors for sightseeing, camping, picnicking, hiking, fishing (both the Rio Grande and Red Rivers are nationally renowned for their rainbow and brown trout fisheries), access to floatboating, and cross-country skiing during winter months. The area is becoming increasingly popular for wildlife viewing, both from vehicles and hiking trails (U.S.D.I. BLM 1987).

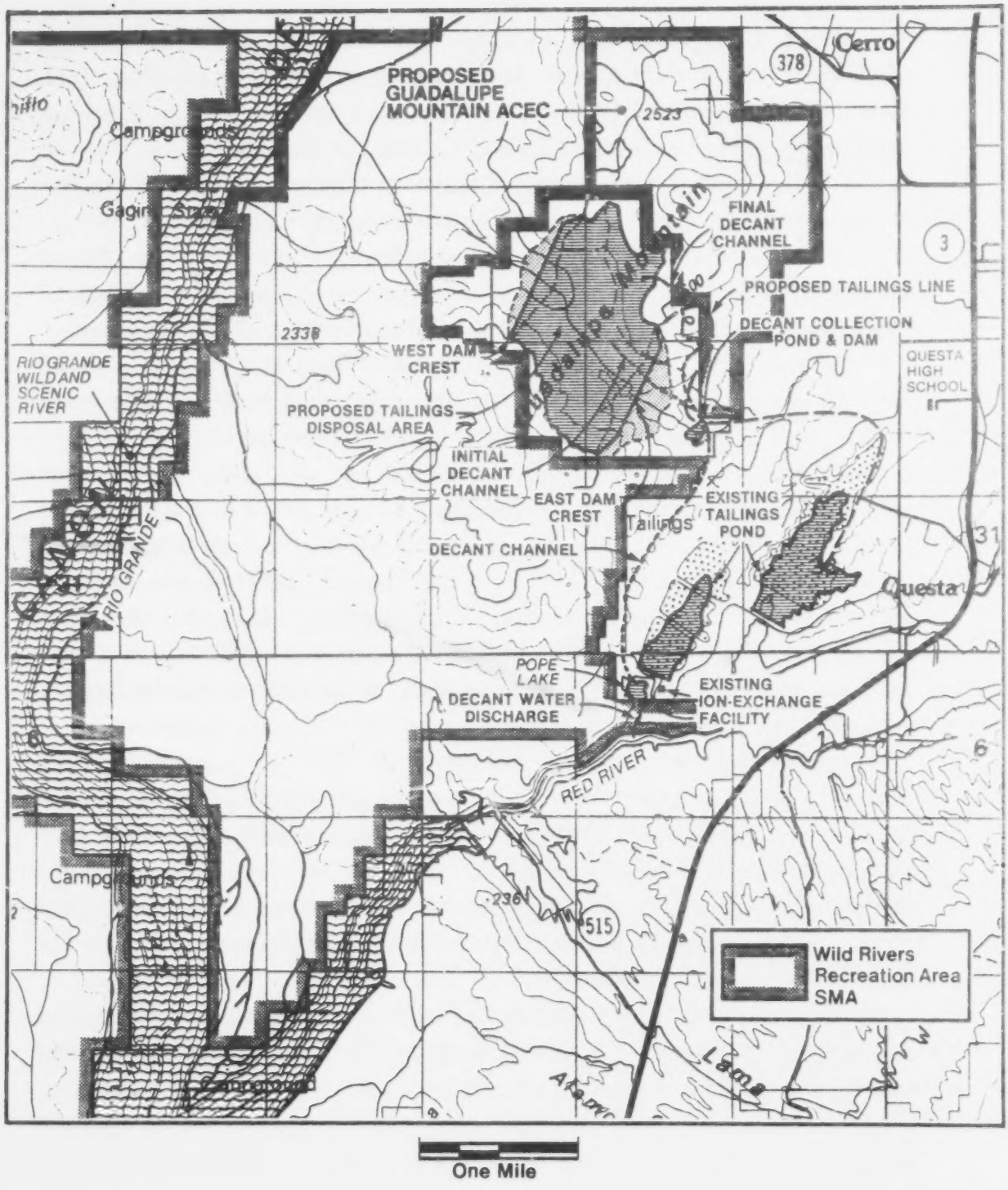


FIGURE 2-6 LAND STATUS MAP

Facilities at the Wild Rivers Recreation Area include a Visitor Center, 47 camping shelters, 7 picnic areas, 8 overlooks, and water and toilet facilities. There are 8 maintained trails (approximately 12 miles) which lead from the rim of the recreation area to the canyon bottoms along the Rio Grande and Red Rivers. These trails were officially designated as part of the National Recreation Trails System in 1981 (U.S.D.I. BLM 1987). Management of the area is covered in the Wild Rivers Recreation Area Management Plan (U.S.D.I. BLM 1988).

Accurate and reliable visitor use data for the entire recreation area are difficult to obtain because of the large land area involved and the lack of any standard visitor registration system or visitor counting procedures. However, based on historical records from the Visitor Center register book and BLM estimations, it is apparent that visitor use at the recreation area has been increasing steadily over the years. Table 2-9 illustrates estimated peak summer season visitor use at the Wild Rivers Recreation Area from 1975-1987. Peak summer season is May through September. BLM officials are anticipating an overall increase in visitor use during 1988 (Mottl 1988, Speegle 1988).

The proposed Guadalupe Mountain ACEC contains significant scenic and cultural values as well as important wildlife habitat (BLM 1987). Guadalupe Mountain is an important scenic feature for travelers on Highway 3 near Questa. The mountain is located near the highway and the entire eastern half of the mountain and associated hills are visible for several miles. The western half of the mountain is an important scenic feature for the entrance to the Wild Rivers Recreation Area (U.S.D.I. BLM 1987).

The Guadalupe Mountain area is not advertised by the BLM to the general public as a recreation area (Speegle 1988), however, the area offers opportunities for dispersed recreation, particularly hiking and hunting. There are no developed recreation facilities in this area. Although there are no official visitor use statistics available specifically for the Guadalupe Mountain area, the BLM has estimated that approximately 10 percent of the people who visit the developed Wild

TABLE 2-9

VISITOR USE AT THE WILD RIVERS RECREATION AREA (VISITORS)[1]

Year	May	June	July	August	Sept.	Total
1987	1,400	3,000	5,000	5,400	2,000	16,800
1986	1,060	2,272	3,786	4,089	1,514	12,721
1985	799	1,712	2,854	3,082	1,142	9,589
1984	827	1,771	2,952	3,188	1,181	9,919
1983	529	1,134	1,890	2,041	756	6,350
1982	554	1,187	1,978	2,136	791	6,646
1981	533	1,143	1,905	2,057	762	6,400
1980	494	1,058	1,763	1,904	705	5,924
1979	457	979	1,632	1,763	653	5,484
1978	433	929	1,548	1,671	619	5,200
1977	365	782	1,304	1,408	521	4,380
1976	357	766	1,277	1,379	511	4,290
1975	221	473	788	851	315	2,648

Source: U.S.D.I. BLM. Visitor Center count and estimations of use from locals and fishermen who do not come to the Visitor Center, and those who reach the Visitor Center after hours. Data was obtained during the peak summer season of May through September.

[1] Previously called the Rio Grande Recreation Area.

Rivers Recreation Area will also use the Guadalupe Mountain area (Mottl 1988, Speegle 1988). Most of the people who use the Guadalupe Mountain area for recreation are from the local area (e.g., Questa) (Speegle 1988).

2.10 Visual Resources

The BLM has implemented a visual inventory and analysis process to provide a systematic interdisciplinary approach to the management of aesthetic values on public lands. The Visual Resource Management (VRM) system inventories existing scenic quality and assigns visual resource inventory (VRI) categories based on a combination of scenic values, visual sensitivity, and viewing distance zones. Four visual resource classes have been established to serve two purposes: (1) as an inventory tool portraying relative value of existing visual resources, and (2) as a management tool portraying visual management objectives. Management objectives for each of the visual resource classes are listed in Table 2-10.

The immediate vicinity of the proposed Molycorp Tailings Disposal Facility includes lands that have been assigned three of the VRM classes. The Rio Grande Canyon is a Class I area by virtue of its Wild River designation. The Wild Rivers Recreation Area and the west face of Guadalupe Mountain are VRM Class II areas. The Guadalupe Mountain saddle, which is the area of Guadalupe Mountain that cannot be seen from the valley to the west or from State Route (SR) 533 to the east, is designated VRM Class III; the east face of Guadalupe Mountain is also designated VRM Class III (Speegle 1988). Table 2-10 contains the specific objectives associated with each of the applicable classes.

2.11 Noise

A description of the environment potentially affected by noise emissions from the proposed project includes identifying noise sensitive receptors and existing noise sources in the vicinity, characterizing terrain features that may affect noise transmission, and determining existing noise levels.

TABLE 2-10

VISUAL RESOURCE MANAGEMENT CLASSES

Class I Objective:	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II Objective:	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III Objective:	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV Objective:	The objective this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominant the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.
Rehabilitation Areas:	Areas in need of rehabilitation from a visual standpoint should be flagged during the inventory process. The level of rehabilitation will be determined through the resource management planning (RMP) process by assigning the VRM class approved for that particular area.

Source: BLM Manual 8411.

The proposed project would generate noise primarily from construction of the two dams. The noise analysis focused on the westerly dam, however, because existing tailings disposal activities and/or terrain barriers intervene between the easterly dam site and noise sensitive receptors.

Noise sensitive receptors near the westerly dam site include primarily the two campgrounds within the Wild Rivers Recreation Area, Sheep Crossing and Chiflo. The nearest is Sheep Crossing, slightly less than 2 miles from the proposed dam site.

Existing noise sources include natural sounds from wind, birds, and insects; noise from automobiles entering or leaving the wild Rivers Recreation Area (including noise from crossing steel cattle guard); and sounds of occasional aircraft overflights. Although the terrain is irregular, there are no substantive terrain barriers between the proposed dam site and the campgrounds.

Monitoring of existing noise levels was not deemed necessary because of the remote location of the project area and the low number of existing noise sources. Existing noise levels were instead estimated, based on EPA literature and ERT file data for similar sites. Existing noise levels are estimated to fall in a range of 40 to 50 decibels, A-weighted (dBA). The lower end of the range represents typical noise levels in rural areas. These estimates are consistent with the results of a brief noise sample collected by NMEID in 1982 that found ambient levels (L_{90}) of 41 dBA on the proposed project site and 42 dBA at the Chiflo Campground (Orton 1982). Noise levels could exceed 50 dBA during high wind episodes or for brief periods of high traffic.

2.12 Cultural Resources

A Class III cultural resource inventory of public land associated with the proposed construction of the Guadalupe Mountain tailings disposal area was conducted by the Research Section of the Laboratory of Anthropology in Santa Fe, New Mexico. Field work was performed during September and October of 1982. A total of 11 archaeological sites (LA-38422 - 38432) consisting of extensive lithic scatters were located during the survey (Seaman 1983).

In 1983, the New Mexico State Historic Preservation Officer (SHPO) concurred with the report's findings and the recommendations of the BLM that the 11 sites were eligible to the National Register of Historic Places (NRHP) under Criterion d, as defined in 35 CFR 60.6 (see Appendix D, Cultural Resources Consultation Correspondence). This determination was made because the sites were likely to yield significant information about Archaic and Basket Maker period sustenance in the region.

In 1984, at the BLM's request, a Cultural Resource Mitigation Plan for the 11 archaeological sites was prepared by the Laboratory of Anthropology (Vierra 1984). This Mitigation Plan outlined two phases of data collection and analysis. The first phase involved defining site boundaries, artifact collection, and subsurface testing. The second phase involved more extensive excavation of sites with buried features or stratified cultural deposits. The SHPO concurred with the BLM's recommendation that there would be no adverse effect to the archaeological sites, if they were mitigated according to this data recovery plan.

Preliminary data recovery was conducted by the Office of Contract Archaeology, University of New Mexico at one site, LA-38424, in October 1986. These activities included resurvey of the site, controlled surface artifact collection, and the excavation of a single hearth (Seaman 1987).

The Class III inventory and preliminary data recovery indicate that Guadalupe Mountain was inhabited by prehistoric people on a seasonal basis for over 6,000 years. Collected artifacts suggest that the area was visited continually from at least the early Archaic period (5500-4000 B.C.) through the Basket Maker period (1-700 A.D.). Sites LA-38422 - 38432 are considered to be highly significant because they appear likely to contain data important to the understanding of Southwestern prehistory. Research on the sites should provide information on site function, chronology, subsistence, technological organization, and the transition from mobile hunting and gathering based on the economy of the Archaic period to the sedentary agricultural economy of the Pueblo periods.

2.13 Socioeconomics

The primary study area for the socioeconomic assessment was Taos County in north-central New Mexico. The communities affected included Questa, Taos, and Cerro. Questa is 3 miles east of the proposed tailings site and 11 miles west of the existing mine. Taos is 28 miles southeast of the proposed site and Cerro is approximately 5 miles north of the proposed site.

Administrative functions within the study area are provided by local governments in Taos County, Taos, and Questa. Cerro is an unincorporated town and is governed by Taos County.

The population of Taos County has grown at a relatively low average rate of 2.1 percent per year from 1980 to 1986 (Kargacin 1987). The 1986 estimated population in Taos County was 22,000, up from the 1980 level of 19,456. The towns of Taos and Questa have grown at an average rate of 1.4 percent and 0.8 percent, respectively, with estimated 1986 populations of 3,670 and 1,260. From 1985 to 1986, no population increase is shown to have occurred in Taos County.

The economy in Taos County has traditionally been based on mining and tourism. In the past two years with the slowdown in the mining sector (with Molycorp as the largest employer), more importance has been placed on the tourist economy, which is centered in the Retail Trade and Services sectors.

2.13.1 Employment and Income

Due to the nature of the primary industry in Taos County, fluctuations in employment and income occur regularly. Only recently has the Taos Ccunty economy been almost totally dependent on the seasonal tourist-related activities that occur primarily in the summer, early fall, and winter. Table 2-11 shows nonagricultural wage and salary employment in Taos County from 1982 to 1986.

Agricultural employment has remained fairly stable for the past several years. The Services and Miscellaneous sector, which includes mining, personal, business, health and social services, and hotels and lodging is the largest employment sector in Taos County. In 1986, this sector supplied 35 percent of the nonagricultural wage and salary employment. Although the services sector is the major employer in the

TABLE 2-11

NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT IN TAOS COUNTY
1982 TO 1986

Sector	1982	1983	1984	1985	1986	1986 % of Total
Manufacturing	389	396	396	364	335	5.0
Mining	*	*	*	*	*	NA
Contract Construction	407	432	428	437	292	4.0
Transportation & Public Utilities	191	221	248	276	235	4.0
Wholesale & Retail Trade	1,380	1,380	1,423	1,496	1,660	26.0
Finance, Insurance & Real Estate	250	298	335	350	318	5.0
Services & Miscellaneous	2,583	2,703	2,744	2,707	2,202	35.0
Government	1,285	1,322	1,298	1,293	1,308	21.0
TOTAL	6,485	6,752	6,872	6,923	6,350	100.0

Source: New Mexico Department of Labor, Economic Research and Analysis, Table B - Labor Information Series.

*Disclosure - Included in Services and Miscellaneous.

county, overall employment has declined by 15 percent over the period 1982 to 1986. Actual employment in the services sector declined by 505 persons from 1985 to 1986, which represents 8 percent of the 1986 total nonagricultural employment in Taos County.

The second most important sector in Taos County is Wholesale and Retail Trade which represents 26 percent of total nonagricultural wage and salary employment. Retail trade grew steadily from 1982 to 1986, with a 20 percent increase in employment throughout the period.

The Government sector also employs a large percentage (21 percent) of workers in Taos County. This sector fluctuated between 1982 and 1986, but showed an overall increase of 1.8 percent.

Unemployment rates in Taos County have remained among the highest in the state. Only Mora County has shown higher unemployment rates than Taos County. This implies that population out-migration has not kept pace with changing job opportunities. In addition, it appears that the appeal of living in Taos County brings in transient populations to fill seasonal jobs in the tourist industries.

Table 2-12 shows civilian labor force, employment and unemployment levels for Taos County and the State of New Mexico from 1983 to August 1987. The state average unemployment rate has ranged from a low of 7.5 percent in 1984 to a high of 10.1 percent in 1983. In Taos County the unemployment rate has generally remained high as compared to any standard. The range of rates shows a low unemployment rate of 16.8 percent in 1984 and a high rate of 27.8 percent in 1986. Monthly rates have reached as high as 32.0 percent unemployment. Unemployment is expected to remain high until economic conditions improve areawide.

2.13.2 Public Fiscal Conditions

Public fiscal resources of the study area refer to government revenue sources and expenditures in Taos County and the communities of Taos and Questa. From 1986 to 1987 assessed values decreased throughout Taos County (Medina and Nichols 1987). The 1986 taxable value for Taos County was $244,068,475 as compared to $195,806,114 in 1987. This decrease in valuation is primarily due to the slowdown in the mining

TABLE 2-12

LABOR FORCE, EMPLOYMENT, AND UNEMPLOYMENT

1983 TO 1987[1]

	1983	1984	1985	1986	1987[2]
State of New Mexico					
Civilian Labor Force	609,000	628,000	642,000	672,000	672,189
Employment	547,000	581,000	585,000	610,000	616,321
Unemployment	62,000	47,000	57,000	62,000	55,868
Rate	10.1%	7.5%	8.8%	9.2%	8.3%
Taos County					
Civilian Labor Force	10,346	10,306	10,428	10,220	10,034
Employment	8,411	8,578	8,289	7,381	7,621
Unemployment	1,935	1,728	2,139	2,839	2,413
Rate	18.7%	16.8%	20.5%	27.8%	24.0%

Source: New Mexico Department of Labor, Economic Research and Analysis, Table A - Civilian Labor Force, Employment and Unemployment.

[1] Annual Average

[2] Preliminary August Estimate

industry and the indirect impacts on other businesses. The decline in taxable value represents a 19.8 percent countywide decrease from 1986 to 1987.

In order to compensate for the decline in taxable value and tax revenues, mill levies have increased. These increases in the mill rate have caused significant increases in property taxes to both residents and businesses. The increased mill rates have made up taxing jurisdiction losses of $687,000 from lost property taxes and other lost Federal Revenue Sharing monies.

Taos County operates largely with funds generated from local and state sources. Budgeted general property taxes and gross receipts taxes represented 26 percent of county receipts in the 1986-1987 fiscal year. This represents an increase of 12.3 percent from 1985-1986. While property tax receipts have increased, revenue sharing monies and gross receipts taxes declined from 1986 to 1987.

Taos and Questa also depend heavily on state and local revenue sources. In Taos, property taxes, franchise, and gross receipts taxes (local and state shared) account for 88 percent of general fund revenues and 45 percent of total revenues. In Questa these taxes represent 59 percent of general fund revenues and 11 percent of total revenues. Federal revenue sharing monies have declined throughout the state. From 1986 to 1987 revenue-sharing funds have decreased by 63 percent in Taos and 69 percent in Questa.

Overall revenues increased by 32 percent from 1986 to 1987 in Questa due primarily to a $900,000 state grant. Gross receipts taxes have decreased substantially (22.0 percent) in Questa.

The overall budget in Taos declined from 1985-1986 to 1986-1987 (2.9 percent). Budget decreases have occurred across the board, especially in the General Fund, Other Funds, Enterprise Funds, and Revenue Sharing revenue sources.

County expenditures increased by 9.6 percent from 1985-1986 to 1986-1987. General fund disbursements represent 44 percent of total countywide expenditures, but decreased by 6 percent over the year.

In Taos and Questa, General Fund expenditures represented 50 percent and 16 percent, respectively, of total expenditures in 1986-1987. From 1986 to 1987 these expenditures increased by 35 percent in Taos and decreased by 16 percent in Questa.

2.13.3 Housing

Recent housing statistics for Taos County are not available, but interviews with the Housing Authority director and several realtors indicate that adequate housing is available in Taos County. As of November 1987, there were between 300 and 325 houses listed for sale in the Multiple Listing Service. The average price of a three-bedroom single-family house is $90,000 (Cowan 1987). Rental housing is less abundant, but still available. Rents in the Taos area range from $250 to $300 per month for a one-bedroom house, to $300 to $390 for a two-bedroom house. Availability of rental housing fluctuates on a seasonal basis. Vacancy rates are very sensitive to the type of units being rented. Vacancies range from 6 percent to 15 percent, with the more-expensive units on the higher end of the average.

2.13.4 Public Services and Facilities

Many public facilities and services are provided within the study area. Existing design capabilities and staffing levels of public facilities and services in the region are generally considered adequate for demand and many have excess capacity.

Health care is provided by Holy Cross Hospital in Taos, which has 33 beds. Additional medical care can be acquired at the Family Practice Clinic in Taos and the Questa Health Center, which provides medical and dental care for Questa and Cerro residents.

Law enforcement in the region is provided by the Taos County Sheriff's Department, headquartered in Taos. The Sheriff's Department serves all of Taos County, including the Town of Questa. There are 12 officers, 4 dispatchers, and 3 secretaries; 2 officers are stationed in Questa. The Department feels that two to three officers working per day is not adequate to cover the entire Taos County area.

The Town of Taos also has a police force with a total of 17 officers. Captain Vidaurre (personal communication 1987) feels that the Department has adequate personnel and facilities to serve the existing population. The Town of Questa has three police officers.

Taos County has 5 full-time firefighters in the Town of Taos and 30 volunteer firefighters countywide. The Questa Village Volunteer Fire Department has 28 volunteer firefighters and 3 pumpers. The Questa and Taos departments are well equipped to serve the existing populations.

Public water supply and wastewater treatment facilities have adequate existing capacity to handle the demands of the current populations in the City of Taos and in Questa. The Village of Questa currently has 2 wells that supply water for approximately 650 families (1,800 population). Combined capacity is approximately 200,000 gallons storage and 381,600 gallons pumping capacity per 24-hour period. The average consumption is well below this level (Cisneros 1987).

The wastewater system in Questa has just recently been built and has the capacity to serve a population of between 4,000 and 5,000. Current treatment is approximately 40,000 gallons per day, design capacity is 70,000 gallons per day. Outlying areas are served by private or community wells and septic systems. Solid waste disposal in Questa is provided by the county; the landfill site is relatively new, and has adequate capacity to serve the Questa area.

Electricity in the study area is provided by Kit Carson Electric Cooperative, located in Taos. There is adequate generating capacity to service the existing population and future growth. The Gas Company of New Mexico provides service to the study area excluding Cerro; adequate capacity exists well into the future. Mountain Bell provides telephone service in the area.

2.13.5 Public Education

The public school systems within the study area include the Taos School District located in Taos, and the Questa School District which serves Questa and the surrounding towns of Cerro, Costillo, and Red River.

Enrollment in the Questa School District has fluctuated through the years, but has generally declined in the past 5 years, especially between the 1983-1984 and 1985-1986 school years (Abeyta 1987). Total enrollment in the Questa School District between 1981 and 1987 is shown below:

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	% Change
Total Enrollment	842	792	839	763	788	723	(14.1)

Although enrollment has declined, the Cerro School serving K-2 is currently at capacity.

Last year the school district issued a new capital improvement bond that will initially be used to build a new high school. The $4-million bond issue contributed to an increase in the mill rate from $7/$1,000 assessed valuation to $13/$1,000. This increase is in addition to the county-imposed 3-mill increase. Taxpayers within the school district are experiencing a significant increase in property taxes due to the bond issue. The tax base for the school district has decreased which has required program and staff cuts in school district operations.

3.0 ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

Chapter 3 presents a discussion of the environmental consequences that would result from implementation of the proposed Molycorp Guadalupe Tailings Facility. In keeping with the directive of the National Environmental Policy Act (NEPA), this chapter focuses on impacts that are considered significant. The general approach followed throughout the chapter is to briefly describe the range of impacts that would occur and then provide a detailed discussion of those impacts that would be considered significant. Where appropriate for the discipline under consideration, impacts are discussed for the construction, operation, and closure phases of the project.

3.2 Air Quality

Relevant New Mexico federal and state air quality standards are summarized in Table 3-1. For particulate matter, the EPA has recently revised the National Ambient Air Quality Standards (NAAQS) to regulate only particulate matter sized 10 microns or below, generally referred to as PM-10. EPA's rationale for changing the standard is that particles must be sized below 10 microns in order to be inhaled into the lungs, thereby impacting human health. This federal rule change is not yet reflected at the state level, where particulate concentrations are still regulated based on total suspended particulate (TSP). It is expected that the State of New Mexico will at some point adopt a PM-10 based particulate standard, but the exact nature of a revised standard is currently under development. However, NMEID officials indicate at this time that they expect to retain the TSP standard in some form (Blankenship 1988). Exceedances of the TSP standard are viewed to be a nuisance only, while the PM-10 standard equates to human health effects.

Impacts to air quality resulting from the new tailings disposal area would be caused by entrainment of particulate matter off the dry surfaces of the tailings pond during high winds. Some of the particulate entrained into the atmosphere would remain suspended and be transported downwind, potentially increasing public exposure to particulate matter in the vicinity of the tailings site. However, since

TABLE 3-1

FEDERAL AND NEW MEXICO PARTICULATE STANDARDS

Federal: PM-10	
24-hour average	150 $\mu g/m^3$
Annual arithmetic mean	50 $\mu g/m^3$
State of New Mexico: TSP	
24-hour average	150 $\mu g/m^3$
7-day average	110 $\mu g/m^3$
30-day average	90 $\mu g/m^3$
Annual geometric mean	60 $\mu g/m^3$

Note: 24-hour standards may be exceeded one time per year by any location.

most of the particulate is comprised of large particles which quickly settle out of the plume due to turbulence and gravitation, the potential impacts would decrease rapidly as the emissions traveled downwind.

In this manner, the expected impacts from the new tailings disposal area would be very similar to those historically experienced from the existing tailings facility near Questa. However, since the proposed site is farther removed from critical impact receptors (such as the Questa High School, which is immediately downwind of the existing tailing site), the new location would not cause impacts to the same degree as presently experienced at these important receptors.

The potential air quality impacts of the proposed new tailings disposal facility were evaluated using an air pollution dispersion model. The EPA Industrial Source Complex (ISC) model was chosen for the study because of its ability to simulate large area emission sources and include the effects of gravitational settling and deposition of particulate matter. Meteorological inputs to the model were derived from an on-site measurement program. Valid meteorological data were collected for 237 days, or about 8 months, from the Guadalupe Mountain saddle. Emissions data were derived from a special monitoring study conducted by the NMEID around the existing tailings ponds. This derivation is explained more fully in the Air Quality Technical Report (ERT 1988). The estimated emission is about 2 lb/acre-hour which applies only to periods when winds exceed the threshold speed of 12 miles per hour (mph). Winds less than 12 mph are considered to be of insufficient velocity to generate dust from the tailings. Based on a maximum tailings area of 580 acres, this emission rate converts to 1,160 lb/hour. This compares to emissions of 900 lb/hour for the 450-acre existing tailings area.

Modeling was conducted for three stages of tailings pond development that are similar to that shown on Figures 1-2, 1-3, and 1-4; however, the development scenarios used in the air modeling were slightly more conservative in that larger areas of dry tailings were assumed. The first stage represents when the tailings level reaches the 8,000-foot contour. At this stage, the surface area of tailings would be slightly under 300 acres. The second stage represents when tailings would reach the 8,100-foot contour. At this time, the tailings would

cover about 450 acres. The third stage represents the maximum extent of the tailings, when the surface of the pond reaches the 8,200-foot contour. At maximum capacity, the tailings pond would cover about 580 acres. In calculating maximum concentrations for the various development stages, it was assumed that the entire surface acreage of the tailings would be dry and contribute to airborne dust concentrations. These acreages included the dam structures up to the dam centerline. This same assumption was also made during the derivation of a tailings emission factor, so the overall effect on the model results is believed to be minimal. In operational reality, approximately 25 to 30 percent of the area would be covered by open water. Of the remaining 70 to 75 percent of the beach area, approximately 50 percent would be kept wet due to the multiple discharge locations for tailings.

The modeling procedures are explained more fully in the Air Quality Technical Report (ERT 1988), which is on file supporting this EIS. The results of the ISC modeling for all three tailings pond development stages are given in Table 3-2. Maximum concentrations are reported for both TSP and PM-10. The predicted concentrations were for locations outside the Molycorp project boundary. Since the boundary would be fenced, locations within the project area would not be accessible to the public. The predicted impacts also include a 24-hour TSP and PM-10 background of 32 $\mu g/m^3$ and of 17 $\mu g/m^3$, respectively. Annual average background has been estimated at 50 percent of these levels, or 16 $\mu g/m^3$ and 9 $\mu g/m^3$, respectively.

The results in Table 3-2 show that maximum TSP concentrations are predicted to exceed the current State of New Mexico 24-hour average particulate standard of 150 $\mu g/m^3$ for all stages of tailings development. However, for PM-10, the predicted concentrations would be well within the present NAAQS for 150 $\mu g/m^3$. In addition, the exceedances of the New Mexico TSP limit would be infrequent and highly localized. For the first development stage, TSP concentrations would exceed the 150 $\mu g/m^3$ limit only in a very small area along the southern project boundary. A total of 3 days per year during high winds are predicted to be over the standard, with no more than 1 day per year at any given location over the standard. For the second stage, impacts

TABLE 3-2

SUMMARY OF MAXIMUM AIR QUALITY IMPACTS FROM THE

GUADALUPE MOUNTAIN TAILINGS FACILITY

Pollutant	Averaging Time	Stage	Tailings Size (Acres)	Max. Concentrations ($\mu g/m^3$)			Days Exceeding Std.
				Tailings	Background	Total	
TSP	24-hour	First	300	129	32	161	1
		Second	450	156	32	188	2
		Third	580	187	32	219	5
TSP	Annual	First	300	5	16	21	-
		Second	450	7	16	23	-
		Third	580	7	16	23	-
PM-10	24-hour	First	300	41	17	58	0
		Second	450	50	17	67	0
		Third	580	60	17	77	0
PM-10	Annual	First	300	2	9	11	-
		Second	450	2	9	11	-
		Third	580	2	9	11	-

would be slightly larger and more extensive. TSP concentrations are predicted to exceed the State standard in an extremely small area along the northwest project boundary and extending out about 200 meters (650 feet) from the southern project area boundary. At the second stage, the model predicts a total of 5 days over the standard, with a maximum of 2 days at any one location. The third development stage, which represents the maximum level of tailings, would result in the greatest impacts, although these impacts would still be relatively minor in terms of duration and geographical extent. At the third stage, model predictions show small areas over the TSP standard along the north and northwest project area boundaries and concentrations over 150 $\mu g/m^3$ extending about 400 meters (1,300 feet) to the south of the project area boundary. A total of 7 days per year would result in concentrations over 150 $\mu g/m^3$, with no more than 5 days at any one location.

The predicted TSP and PM-10 concentrations at locations of potential public exposure to windblown dust from the tailings are given in Table 3-3. These sensitive receptors include the Wild Rivers Recreation Area, the communities of Buena Vista and Cerro, the town of Questa, and Questa High School. The model predictions show maximum impacts would be well below applicable air quality standards at these locations, which is most likely attributable to the distance to these receptors from the proposed tailings facility. These predictions also do not include the fact that a large percentage of area would be wet at all times.

The modeling results indicate that during periods of high winds, concentrations of TSP may exceed current State of New Mexico standards in the immediate vicinity of the tailings. However, since PM-10 impacts are within allowable limits, these impacts would be considered a nuisance rather than a public health hazard.

3.3 Water Resources

3.3.1 Surface Water

No impacts to surface water resources would occur during construction of the tailings facility; and no significant impacts by tailings pond seepage or discharge from the impoundment to surface water

TABLE 3-3

PREDICTED AIR QUALITY IMPACTS OF GUADALUPE MOUNTAIN
TAILINGS FACILITY AT SENSITIVE RECEPTORS
(MAXIMUM DEVELOPMENT STAGE)
(in $\mu g/m^3$)

	Pollutant	Maximum			2nd Maximum		
		Tailings	Background	Total	Tailings	Background	Total
Wild Rivers Rec Area	TSP (24-hour)	43	32	75	13	32	45
	TSP (Annual)	<1	16	16	—	—	—
	PM-10 (24-hour)	14	17	31	4	17	21
	PM-10 (Annual	<1	9	9	—	—	—
Buena Vista	TSP (24-hour)	<1	32	32	<1	32	32
	TSP (Annual)	<1	16	16	—	—	—
	PM-10 (24-hour)	<1	17	17	<1	17	17
	PM-10 (Annual	<1	9	9	—	—	—
Cerro	TSP (24-hour)	<1	32	32	<1	32	32
	TSP (Annual)	<1	16	16	—	—	—
	PM-10 (24-hour)	<1	17	17	<1	17	17
	PM-10 (Annual	<1	9	9	—	—	—
Questa High School	TSP (24-hour)	9	32	41	5	32	37
	TSP (Annual)	<1	16	16	—	—	—
	PM-10 (24-hour)	3	17	20	2	17	19
	PM-10 (Annual)	<1	9	9	—	—	—
Town of Questa	TSP (24-hour)	23	32	55	17	32	49
	TSP (Annual)	<1	16	16	—	—	—
	PM-10 (24-hour)	8	17	25	6	17	23
	PM-10 (Annual	<1	9	9	—	—	—

are expected, that is, the quality of stream, spring, or river discharges would not be modified as a result of tailings pond seepage to the extent that water used by established users (e.g., wild and scenic habitat) was measurably reduced; aquatic habitats supported reduced fish populations, or the water quality was in violation of State water quality standards/criteria because of the introduction of contaminants.

Existing water quality parameters for the Rio Grande and Red Rivers are shown in Table 2-4. Dames & Moore (1987 and 1988) and Geocon (1988) studies indicate that metals from tailings pond seepage should be attenuated in the unsaturated zone beneath the pond before reaching the water table. Therefore, groundwater discharge to both rivers would not be degraded by metals originating from the tailing pond seepage. The above cited reports also indicate that groundwater directly beneath the pond would probably show an increase in TDS and SO_4 within 5 years, but that the predicted TDS and SO_4 values would not exceed State standards. Mixing would occur through time and over the distance between the project area boundary and discharge points. Dispersion and dilution should continually occur along the flow route. By the time of discharge in a spring complex, effluent should have been further mixed and diluted. Thus, no significant impact by tailings pond seepage to surface water is predicted.

The proposed tailings disposal facility would employ the same surface water discharge point (Pope Lake) as the existing pond, and would contribute discharge that is chemically very similar to that discharged at Pope Lake (see Table 1-3) under Molycorp's existing NPDES permit. NPDES permit daily maximum limits are not expected to change, and no significant impact to surface water is expected as a result of additional discharge from the proposed impoundment.

Molycorp's diversion rights to water from the Red River are limited to 15 cfs; actual usage is 5 cfs. No adverse impacts to surface water quantity would result from the proposed project.

3.3.2 Groundwater

No impacts to groundwater resources would occur during construction of the tailings facility. Operation of the tailings facility is expected to result in some downward seepage of the tailings solution to the regional water table. Extensive groundwater studies performed by Dames & Moore (1986, 1987) and by Geocon (1988), as discussed below, indicate this impact would not be significant in that the quality of groundwater would not be modified as a result of tailings pond seepage to the extent that water used by established users (e.g., BLM visitor's center well, municipal wells) was measurably reduced or the water quality was in violation of State water quality standards because of the introduction of contaminants.

Two deep wells (1,207 and 632 feet below surface) were installed by Dames & Moore (1988) to assist in determining the amount of existing underflow in the vicinity of the proposed Guadalupe Mountain tailings impoundment and to assess the magnitude of contaminant transport in the saturated zone away from the pond. Pumping tests confirmed that the volcanic rocks beneath Guadalupe Mountain are capable of transmitting large volumes of groundwater. The wells were tested at flow rates of 125 and 175 gallons per minute (gpm) with no appreciable drawdown being observed. Based on accretion studies in the Rio Grande and Red River and discharge rates of springs issuing from the river canyons, it was previously estimated that at least 50 cubic feet per second (cfs) of underflow was present along a 5-mile line between Cerro Chiflo and the head of the Red River Canyon (Dames & Moore 1987). It was further concluded that this represented an underflow of approximately 10 cfs/mile along this transect. A value of transmissivity based on specific capacity from one of the wells was used to calculate an underflow of 51 cfs over a 5-mile distance. This results in approximately 10 cfs/mile which is comparable to the estimate given by the accretion study. Such corroboration indicates that the estimate of transmissivity based on the specific capacity relationship is the most representative of actual formation conditions.

The relationship between specific capacity (Q/s) and transmissivity (T) indicates that the T of the formations tested in the wells is on the order of 1.8×10^6 gal/day/ft (240,000 ft^2/day). Assuming an aquifer

thickness of 100 feet (i.e., the thickness of the test interval), a hydraulic conductivity of 2,400 ft/day (0.85 cm/sec) was calculated (Dames & Moore 1988).

In a separate study (Geocon 1988), seepage rates over time were predicted for the tailings disposal facility, which by design would control seepage and minimize impact on the environment. Geocon's estimated seepage rates are presented in Table 3-4. The study concluded that under normal operating conditions, the total seepage from the proposed tailings impoundment would range from 0.2 cfs in the early stages of operation to 0.5 cfs at the end of its operating life. During the first year start-up conditions, Geocon estimated that a maximum 0.31 to 0.98 cfs of seepage from the impoundment could occur.

The width of the tailings impoundment area was estimated to be approximately 6,000 feet (Geocon 1988). The seepage "footprint" at the water table beneath the tailings pond was estimated to be about 11,000 feet based on modeling studies conducted by Dames & Moore (1987). Using these two values (6,000 and 11,000), it was shown that the rate of underflow moving beneath the proposed tailings pond would be 11.7 and 21.4 cfs, respectively (Dames & Moore 1988). Typical water quality parameters of seepage water discharged from the existing impoundment are shown in Table 1-3.

A modeling analyses of flow and solute transport in the unsaturated zone beneath the proposed tailings pond (Dames & Moore 1987) predicted that molybdenum, manganese, and lead would take more than 30 years to travel to the water table, by which time they would be attenuated. Total dissolved solids (TDS) and SO_4 were predicted to take approximately 5 years to travel to the water table. Figures 3-1 and 3-2 depict mixing concentrations for underflows of 11.7 cfs and 21.4 cfs, respectively. In both of these figures, the seepage rate shown represents the maximum range of possibilities and varies from 0.0 cfs to 1.5 cfs. The TDS and SO_4 concentrations (as the seepage reaches the water table and mixes with the underflow) vary linearly with the seepage rate. The relationships between mixing concentrations and the long-term average seepage rate of 0.52 cfs and the maximum seepage rate of 0.98 cfs (Geocon 1988) are designated in both figures. In both cases, the predicted concentrations of SO_4 and TDS directly beneath the pond

TABLE 3-4

ESTIMATED SEEPAGE RATES AT THE

GUADALUPE MOUNTAIN TAILINGS FACILITY

Stage	Estimated Surface Elevation (feet)		Estimated Area (acres)			Q (cfs)[1]
	Water	Tailings	Total	Water	Tailings	
Initial Pond Development						
1 Month	7,915	7,905	21.5	21.5	10.1	0.31[2]
1 Year	7,960	7,955	143	13.8	129.2	0.98[3]
Normal Operation						
5 Years	8,010		267.7	50	217.7	0.28[4]
Ultimate	8,190		486.7	50	436.7	0.52[5]

Source: Geocon 1988.

[1] Q = estimated total seepage.

[2] Assuming:
- 10 ft. clear water over settled tailings
- hydraulic gradient in tailings and overburden = 1
- vertical permeability of tailings = 1.0×10^{-5} cm/sec
- permeability of overburden = 1.0×10^{-5} cm/sec

[3] Assuming:
- hydraulic gradient in overburden and tailings = 1
- vertical permeability of tailings:
  slimes predominant zone (50 acres) 1.0×10^{-6} cm/sec
  balance of area 6.3×10^{-6} cm/sec

[4] Based on unit seepage rates (cfs/acre): pond = 0.00172
beach = 0.00087

[5] Based on unit seepage rates (cfs/acre): pond = 0.00145
beach = 0.00103

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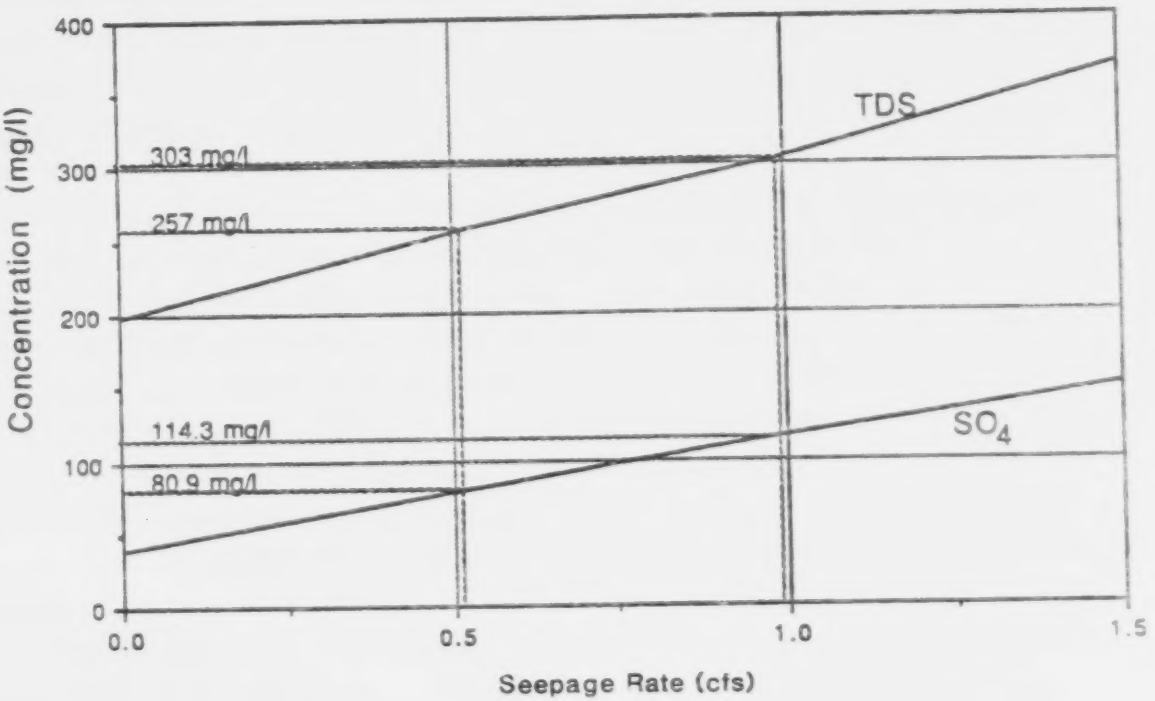
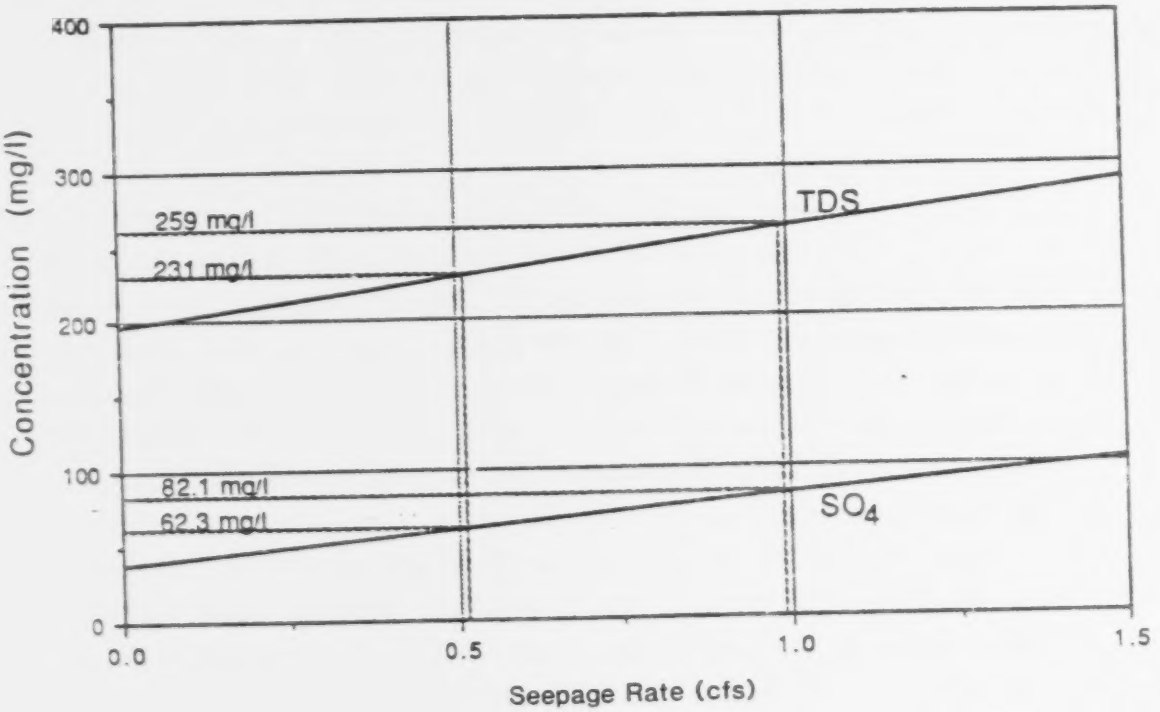


Source: Dames & Moore 1988 .

FIGURE 3-1 MIXING CONCENTRATIONS FOR UNDERFLOW OF 11.7 cfs



Source: Dames & Moore 1988

FIGURE 3-2 MIXING CONCENTRATIONS FOR UNDERFLOW OF 21.4 cfs

would be well below the New Mexico water standards of 600 and 1,000 mg/l, respectively. These findings are corroborated by results presented in Dames & Moore (1987), when a hydraulic conductivity similar to that determined through hydraulic testing (1×10^{-1} cm/sec) was used in model calculations.

Groundwater quality in the area, including water from the BLM visitor center well and wells serving the towns of Questa and Cerro, would not be significantly impacted.

3.4 Topography/Geology

Construction of the proposed tailings facility at maximum buildout would result in the permanent alteration of approximately 825 acres of land in the Guadalupe Mountain area. The two tailings dams would be located at the northwest and southeast ends of the saddle which separates the two peaks of Guadalupe Mountain. The saddle floor would ultimately be raised 300 to 380 feet (U.S.D.I. BLM 1985). This topographic modification is addressed further under visual resources (see Section 3.10).

Minor impacts to geologic resources would occur during construction and operation of the tailings facility. Impacts would include the displacement of a moderately large volume of geologic material to construct the dams and induced strain on bedrock with probable fracturing as a result of blasting. No unique geologic features or geologic units bearing paleontological resources are known for the proposed impact areas.

The low incidence of earthquakes places the study area in a Seismic Risk Zone 1, where minor damage is expected to occur in the event of an earthquake. Five major faults are located outside the study area, the closest is about 2 miles from the proposed tailings area (see Figure 2-2).

Some downward seepage of the tailings solution is expected to occur through the permeable underlying rhyodacite and basalt. This is expected to percolate downward to the regional water table, as discussed under groundwater (see Section 3.3).

3.5 Soils

Construction and operation of the proposed Molycorp tailings facility would result in the disturbance (i.e., burial, horizon mixing, compaction) of about 825 acres of soil resources. Approximately 97 acres of the total disturbance area include the Fernando-Hernandez soils which contain suitable salvageable topsoil (see Table 3-5). The remaining acreage contains soils not suitable for salvage. The topsoil material would be permanently lost as a result of the tailings pond excavation and construction of the dams. Although no topsoil would be stripped and stockpiled at the proposed tailings facility, topsoil would be retrieved from the Applicant's off-site reserves (properties) following dam construction and after closure of the facility. Sufficient volumes of suitable soil material would be applied to all disturbed areas to provide a seedbed for reseeding efforts. The Applicant has committed to providing one foot of topsoil cover (see Vegetation under Section 3.15).

Applicant-committed reclamation measures (i.e., erosion control and revegetation techniques) would minimize soil losses and expedite soil stabilization and revegetation.

3.6 Vegetation

Impacts associated with construction and operation of the proposed tailings facility include vegetation removal and loss or reduction of plant productivity. A total of approximately 825 acres would be affected. The majority of the disturbance (87 percent) would occur in the pinyon-juniper woodland and upland forest types which dominate the Guadalupe Mountain area (Table 3-6). About 110 acres of the sagebrush/grassland type would be affected, primarily in the saddle area. Minor impacts to agricultural land and previously disturbed areas would occur along the tailings line and access road.

All wood and timber within the proposed tailings area would be removed during construction. Based on BLM production estimates, the timbered areas (upland forest type) average 1,000 board feet/acre and the woodlands (pinyon-juniper type) contain on the average 7.4 cords of wood/acre. The proposed project would disturb 325 acres of upland forest and 390 acres of pinyon-juniper, which translates to 325,000 board feet of timber and 2,886 cords of wood. The wood would be

TABLE 3-5

SOIL TYPES AFFECTED BY THE PROPOSED PROJECT

Soil Type	Acres	Relative Percent
Fernando-Hernandez Association	97	12
Rock Outcrop-Raton Complex	712	86
Fernando, Cobbly Loam	16	2
Total	825	100

TABLE 3-6

VEGETATION TYPES AFFECTED BY THE PROPOSED PROJECT

Vegetation Type	Acres	Relative Percent
Pinyon-Juniper Woodland	390	47
Upland Forest	325	40
Sagebrush/Grassland	110	13
Total	825	100

Source: ERT, Inc.

salvaged but the loss of timber-producing lands would be a long-tem impact. Woodland product sales of fuel wood, posts, Christmas trees and wildlings, and commercial saw timber sales would maximize use of these resources removed from the proposed tailings facility (BLM 1985). Livestock grazing reductions for the 30-year life of the project would also occur (see Section 3.8).

Applicant-committed reclamation measures including topsoiling (from topsoil reserves off-site) to provide a seedbed, reseeding (following construction of the dam faces and after closure of the tailings facility), and implementing erosion control plans should increase the probability and rate of vegetative reestablishment.

Impacts to threatened and endangered federal or state-listed plant species would not occur as a result of the construction and operation of the tailings facility.

3.7 Wildlife

3.7.1 Construction

Aquatic. Facility construction would not affect the Big Arsenic and Little Arsenic spring systems, located approximately 4 miles southwest of the proposed project site, and would, therefore, avoid any disturbance to benthic macroinvertebrates currently inhabiting the springs (see Appendix B). Nor would any adverse impacts to aquatic species; specifically game fish species within the Rio Grande and Red River, result from construction activities on the Guadalupe Mountain site.

Terrestrial. Construction procedures for the proposed project would include vegetation removal for site clearance. Approximately 825 acres would be affected, with the majority of disturbance (87 percent) occurring in the pinyon-juniper woodland and upland forest types (see Table 3-6). The disturbance to the sagebrush/grassland type would affect about 110 acres, primarily in the saddle area of Guadalupe Mountain. Construction of the tailings facility would result in

long-term (greater than 30 years) removal of approximately 825 acres of wildlife habitat. Consequently, these acreages would be unavailable for wildlife utilization.

Grading of the site would require removal of the wildlife watering device (inverted umbrella) which would affect the wildlife species dependent upon the local water source. A small gully plug reservoir located on the property would also be removed during project construction. This would be particularly important during dry seasonal periods, when a greater number of species would be utilizing the water catchment (Kuykendall 1988).

Large and medium-sized mammals would be displaced during construction activities from the proposed facility site and surrounding habitat. No direct impacts are expected to occur to these species during project construction.

Construction of the tailings facility would result in the displacement or death of smaller, less mobile wildlife species found onsite. Small mammals, reptiles, and bird nestlings would be subject to direct mortality from construction; but many of the affected species, especially small mammals, have a high reproductive potential and are common in surrounding habitats.

Adult birds would avoid the area during project construction and would, therefore, not be directly impacted. However, nesting game or raptor species utilizing the site or surrounding habitat would be precluded from nesting. Waterfowl and shorebirds occurring in adjacent areas would not be affected during these activities.

The bald eagle, American peregrine falcon, ferruginous hawk, and Swainson's hawk potentially forage within the project area. These species would avoid the facility site during construction and would consequently not suffer direct impacts. The whooping crane, mountain plover, and white-faced ibis would not be expected to occur on the project site.

Project construction would also generate an increase in traffic, noise, and human activity, resulting in small, incremental increases in wildlife road kills, and harassment. The project site would be fenced to control access and would be closed to hunting.

3.7.2 Operation

Aquatic. No aquatic resources occur on the proposed project site. In addition, no detrimental effects would be expected for the Big and Little Arsenic spring complexes located approximately 4 miles southwest of the site (see Figure 2-3). According to Section 3.3, average seepage rates from the operation of the tailings pond have been projected to range from 0.28 gpm to 0.52 cfs (Geocon 1988). When compared to measured annual groundwater contribution to the Rio Grande, in the form of seepage, the additional seepage from the tailing pond would contribute a negligible amount to the total groundwater flow. Modeling efforts (Dames & Moore 1988; Geocon 1988) have also shown that the seepage from the proposed tailings pond will not result in exceedances of state or federal water quality standards. These standards include measurements for both TDS and metals. Noting these guidelines, the water temperature, flow stability, and water quality within the springs complexes should not be adversely affected, and no toxic effects to the benthic macroinvertebrates that currently inhabit the aquatic systems are expected to occur.

A mixture of surface water and collected seepage (decant) is proposed to be transported from the Guadalupe Mountain tailings facility back to the existing tailings facility. It would then be treated by an ion-exchange process to remove existing molybdenum and subsequently discharge into Pope Lake and the Red River (see Section 3.3).

Toxicity tests have been conducted on Daphnia by Analytical Biochemistry Laboratories using the tailings operations effluents taken at the Pope Lake outlet. The Daphnia organisms showed no acute effects during the bioassay tests following exposure to undiluted tailings effluent. As discussed, the seepage and decant from the proposed Guadalupe Mountain site would undergo substantial dilution before any potential exposure to aquatic organisms. No adverse effects to the species inhabiting the springs or rivers would be expected.

Terrestrial. The 825 acres proposed for facility site clearance would be unavailable for wildlife utilization for the life of the project (30 years) and possibly longer, depending upon selected

reclamation practices and procedures. Guadalupe Mountain provides high quality foraging habitat and is utilized yearlong by mule deer. The loss of this habitat would adversely affect the local mule deer population, requiring movement of individuals out of the area into adjacent habitats, which may already be at their carrying capacity. However, crucial mule deer range would not be affected. There would also be a loss of potential habitat for the small resident elk population reported in the area. The loss of optimal thermal cover for resident elk during the life of the project would be important, due to the limited amount available to area wildlife (Kuykendall 1988). The area is considered within the potential pronghorn range, and that potential for pronghorn occurrence would be lost for the area of disturbance of the life of the project.

The project would reduce the available habitat and prey base for bobcat, coyote, gray fox, and ringtail, but effects to regional populations are not expected. Following facility construction, these species would likely return and occupy adjacent areas of the project site. Mountain lion and black bear would be eliminated from the project site and would be less likely to occur in the surrounding areas for the life of the project.

No impacts would be expected for small-sized mammal and reptile species during project operation. Nor would amphibious species found in nearby aquatic systems be detrimentally affected during facility operation, since predicted water quality is not expected to exceed state or federal water quality standards (see Section 3.3.).

Upland game birds and raptor species would lose potential nesting and forage habitat during the life of the project. However, individuals would continue to utilize adjacent areas, and impacts from project operation are not expected. Waterfowl and shorebirds may occasionally use the tailings pond during project operation. A variety of species have been recorded visiting the current Molycorp tailings facility (NMGF 1983). Appendix B lists possible species likely to utilize the tailings pond.

Bald eagles wintering in the region and migrating whooping cranes may possibly use or fly over the project area during foraging. However, onsite occurrence would likely be sporadic. No impacts would be expected for this species.

There is concern that the locally breeding peregrine falcons would be impacted by the facility operation. Concerns include loss of habitat, reduction of prey availability, and a potential for decreased peregrine reproduction due to ingestion of pesticide-contaminated prey species. Peregrines may travel up to 17 miles from nesting locations to hunting areas (Benton 1987, U.S.D.I. FWS 1977) and a 10-mile radius from an active peregrine eyrie is generally considered to be important foraging habitat. The proposed tailings facility is located within the anticipated hunting range of the peregrine eyrie; therefore, peregrine foraging habitat could be affected. However, the project site represents less than 1 percent of the peregrine's hunting territory.

The concern regarding increased exposure to pesticide-contaminated prey species attracted to the tailings pond was considered by the U.S.D.I. FWS in preparation of their Biological Opinion (see Appendix C) required under Section 7 of the Endangered Species Act. The source of pesticide contamination of migratory waterbirds potentially occurring on the project site is currently unknown. Possible sources of chlorinated hydrocarbons for these prey species may originate from winter areas in agricultural and aquatic habitats in southern New Mexico as well as from wintering areas in Latin America (Kennedy and Stahlecker 1986).

Based on the agency's evaluation, it was considered unlikely that the project area would be highly utilized by the resident peregrines, due to the distance from the primary peregrine falcon use area. Although the possibility of onsite peregrine use may increase with the added presence of waterfowl and shorebird species on the project site, it is unlikely that concentrations of migratory waterbirds would be attracted to the proposed tailings facility to the extent necessary to constitute a substantial prey base for the peregrine. The U.S.D.I. FWS determined that the proposed project is not likely to jeopardize the continued existence of the bald eagle or peregrine falcon (U.S.D.I. FWS 1983).

The ferruginous hawk, Swainson's hawk, mountain plover, and white-faced ibis may sporadically occur within the project area; however, no nesting sites for these species have been delineated on or adjacent to the proposed facility site (Kuykendall 1988). No adverse impacts are expected for these species during project operation. Periodic contact with state and federal wildlife agencies has determined that no additional species in the project area have been listed or are proposed for listing. In summary, impacts to threatened and endangered federal and state wildlife species would not occur as a result of the construction and operation of the tailings facility.

Following facility closure, the tailings would be capped with a minimum of 1 foot of topsoil and reclaimed. There is a concern for potential uptake of toxic elements from the tailings material into vegetation and the terrestrial food web. Table 1-2 outlines the constituents of the tailings. Toxic elements such as lead, selenium, and molybdenum would be present in limited quantities. Although selenium and molybdenum are essential elements in the diets of livestock and many other animals, only very small amounts are required (0.1 mg/kg or less, dry matter basis) (Stoddart, Smith, and Box 1975). Selenium concentrations in forage exceeding approximately 3 to 5 parts per million (ppm) may cause animal toxicity; in addition, molybdenosis may occur in ruminants when molybdenum concentrations in forage exceeds approximately 5 ppm (Colorado School of Mines Research Institute 1981).

Studies have shown that vegetation grown on uranium tailings piles in New Mexico contains higher concentrations of selenium, arsenic, lead, and copper than vegetation growing on adjacent rangeland (Kelly 1979). Capping the tailings with topsoil should reduce uptake. The uptake of contaminants by vegetation and the consumption of this vegetation by wildlife or livestock may be important within the foodchain. However, the uptake by vegetation is probably a minor transport process when compared to the erosion of bare tailings (Dreesen 1978). Because of the nature of a tailings impoundment, such as that proposed by Molycorp, the likelihood of tailings erosion is very low. If the soil cover over the reclaimed tailings piles is deep enough to prevent significant root penetration into the tailings, no contamination uptake should occur.

Another concern is the contamination of small mammals or other animals burrowing into the tailings materials and in turn affecting other species. Data on this subject are not available; however, adequate capping of the tailings, as proposed, should also eliminate this problem.

Reclamation of the tailings facility would follow recommended BLM procedures. Minimum depth of topsoil would be 1 foot to aid revegetation and prohibit substantial root penetration. The fenced enclosure, surrounding the site, would remain during these studies to limit wildlife access (see Vegetation under Section 3.15).

3.8 Land Use

3.8.1 Land Status and Land Use Plans

The proposed project site is located on public lands administered by the BLM. Management of the area is covered in the Taos Resource Management Plan (RMP) that was approved July 26, 1988. The proposed development is compatible and consistent with this plan. A recommendation in the RMP specifically excludes the proposed Molycorp tailings site from the adjacent Wild Rivers Recreation Area Special Management Area (SMA) pending the completion of this EIS and a final decision regarding the proposed project.

The proposed site could become private land if the existing claims are patented. Taos County does not currently have an adopted land use plan or zoning ordinance. Private land development will be addressed at the time a county land use plan is prepared.

3.8.2 Prime and Unique Farmland

As the project is currently designed, no direct impact on prime or unique farmland may be expected from the Proposed Action as the nearest prime farmland is approximately 1 to 2 miles to the northeast of the proposed site.

3.8.3 Livestock Grazing

The BLM quantifies the capacity (i.e., stocking rate) of each grazing allotment in terms of Animal Unit Month (AUM) preference

numbers. The AUM preference number for a particular allotment does not change from year to year; however, the number of cattle permitted to graze on an allotment might vary from season to season depending on such factors as the condition of the resource and length of the grazing season (e.g., 3 months vs. 6 months). Consequently, impacts to livestock grazing allotments are quantified in numbers of AUMs affected, not by head of cattle. The actual impact upon each livestock operation would be contingent upon the existing level of use, and the individual permittee's ability to adjust to the reductions.

Two livestock grazing allotments would be directly affected by the Proposed Action. Reductions in public land AUMs ranging from 23 percent to 70 percent may be expected. Table 3-7 summarizes the public land AUM reductions that would occur.

The Proposed Action would reduce the number of AUMs on Allotment 608 by 23 percent, for a net loss of 48 AUMS. The affected area includes a drainage and saddle which have a good diversity of grasses and high forage value. In addition, two range improvements would be affected by the Proposed Action, an earthen livestock reservoir and an inverted umbrella located on this allotment. The earthen livestock reservoir would be buried beneath the west dam. The inverted umbrella will be dismantled and relocated to an alternate location to be determined by the BLM.

However, Allotment 608 represents only the BLM-permitted land that this individual permittee uses. In order to maintain this livestock operation on an annual basis, the permittee utilizes other grazing land in the area, including private, U.S. Forest Service, and State of New Mexico leased lands. This livestock operation totals approximately 90 head of cattle (Yonemoto 1988). A herd this size would require approximately 1,080 AUMs annually. Consequently, the 48 AUMs affected by the proposed project represent less than 5 percent of the total number of AUMs required annually for this livestock operation. The permittee on Allotment 608 would probably need to reduce the number of animals using this allotment (Yonemoto 1988).

Allotment 609, the most affected allotment in terms of percent loss of AUMs (70 percent), has not been permitted for two years. In addition, the BLM has indicated that this allotment probably would no

TABLE 3-7

REDUCTIONS IN GRAZING PRIVILEGES ON
THE PROPOSED TAILINGS DISPOSAL SITE

Allotment Number	AUMs Before Construction	AUMSs After Construction	Percent Loss
608	210	162	23
609	30	9	70

Source: ERT, Inc.

longer be permitted for grazing due to the lack of an adequate water supply and sparse grazing vegetation (i.e., there is too much pinyon/juniper and not enough grasses) (Yonemoto 1988).

Farm credit agencies and/or banks base loan amounts, in part, on the number of AUMs a livestock operator has leased and will loan approximately $800 per animal unit. An animal unit is the equivalent of one grazing animal per month for one year (i.e., total number of AUMs/12 months = yearly animal units) (Yonemoto 1988). A reduction in the number of AUMs on an allotment will also decrease the potential loan value of that allotment. For example, Allotment 608 would lose approximately 48 AUMs under the Proposed Action. The reduction in potential loan value would be approximately $3,200 (48 AUMs/12 months = 4 animal units x $800 per animal unit = $3,200) (Yonemoto 1988). Allotment 609 would decrease approximately $1,400 in potential loan value.

Finally, the BLM would lose $106.26 for the 1988 grazing period in revenue (69 AUMs x $1.54 per AUM grazing fee = $106.26). The cost per AUM is based upon a fee formula which may change annually.

3.9 Recreation

The proposed Molycorp tailings site is not located within a designated recreation area. However, it is adjacent to and nearly surrounded by the Wild Rivers Recreation Area SMA which is made up of the Wild Rivers Recreation Area and the Guadalupe Mountain ACEC (see Figure 2-6). Management of these areas is covered generally in the Taos RMP (U.S.D.I. BLM 1988), and more specifically in the Wild Rivers Recreation Area Management Plan (U.S.D.I. BLM 1988). The Proposed Action is consistent and compatible with both plans.

The Proposed Action would result in a reduction, or restriction, of access to a portion of the Guadalupe Mountain area for recreation use, including day hiking, camping, ORV use, hunting, and cross-country skiing.

The Wild Rivers Recreation Area Management Plan recommends the area immediately to the west of the proposed tailings disposal site be managed as a low use recreation zone for both motorized and non-motorized backcountry camping and for wildlife viewing. This recreation plan includes most of the Guadalupe Mountains. Consequently,

people will still have access to most of the Guadalupe Mountain for recreation use (Speegle 1988).

Implementation of the Proposed Action would also result in noise (Section 3.11) and visual impacts (Section 3.10) in the vicinity of the Wild Rivers Recreation Area.

3.10 Visual Resources

Visual effects of the proposed Molycorp Tailings Disposal Facility were analyzed using the procedures outlined in the BLM Visual Resource Contrast Rating Handbook (U.S.D.I. BLM 1986). Visual impact significance was determined by comparing visual contrast ratings for the proposed facilities with visual resource management (VRM) class objectives for the respective management class affected (Table 2-10).

Visual contrast analyses were conducted from three numbered "key observation points" (KOPs): (1) at the entrance to the Sheep Crossing Campground, representing all motorist access to the Wild Rivers Recreation Area as well as campers and hikers using the campground as a base; (2) on the Rio Grande approximately 2 miles upstream from Sheep Crossing Campground, representing boaters on this "very difficult" rated section of the river; and (3) a point on State Route (SR) 533 (formerly SR 3) approximately 2 miles southwest of the SR 38 intersection in Questa, representing travelers on the highway, especially those approaching from the south. These locations are shown on Figure 3-3.

Development of the proposed tailings facility would result in a significant increase in visual contrast as viewed from KOP 1 and KOP 2. The visual effect of the westerly dam would be particularly strong as viewed from Sheep Crossing Campground (KOP 1) because the flat valley location of the viewer and the scarcity of interesting visual features in the near foreground encourages viewers to look outward into the middle distances and beyond, to the area where the dam would be located. The light color of the dam face, even when seeded to grasses, would contrast starkly with the dark green of the natural pinyon, juniper, and upland conifer woodlands on Guadalupe Mountain during much of the year. Figure 3-4 illustrates the view from KOP 1 with and without the dam at maximum development. The color contrast would be most noticeable during construction periods when the dam face would be completely

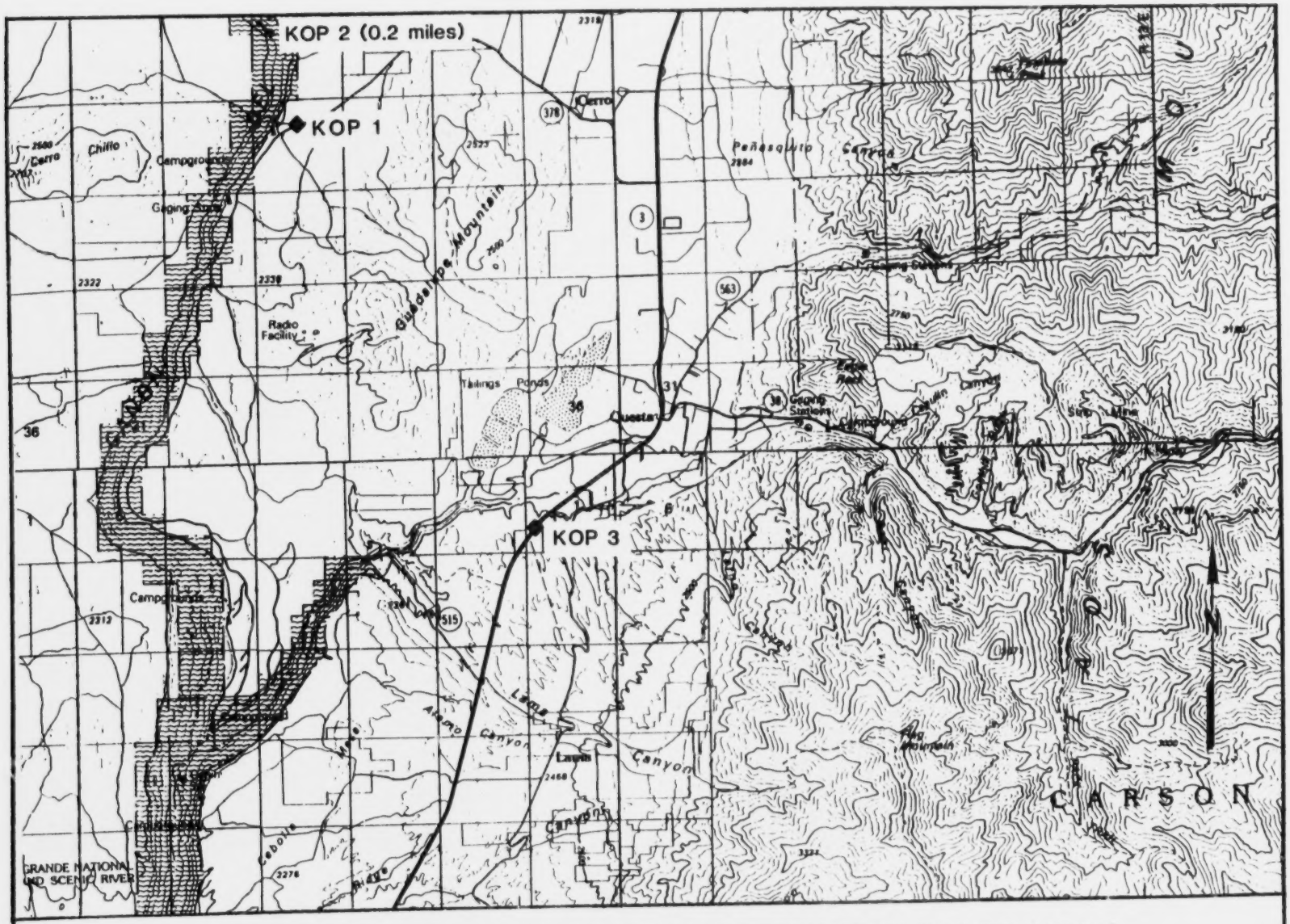


FIGURE 3-3 VISUAL RESOURCE KEY OBSERVATION POINTS (KOPs)

FIGURE 3-4 VISUAL COMPARISON OF VIEW FROM KOP 1 WITH AND WITHOUT THE DAM (AT MAXIMUM DEVELOPMENT)

unvegetated but would continue throughout the life of the project because of the type of grasses that thrive in the arid local climate. The strong color contrast would be reinforced by the flat-topped geometric shape of the dam. The color and shape together would demand the attention of even casual observers, forcing them to notice the dam as a man-made intrusion into a predominantly natural landscape. This would conflict with the VRM Class II visual objective.

The effects on views from the edge of the river canyon would also exceed the limits of the VRM Class II objective, primarily because of the color contrast noted above. Concern over the impacts would not be as great, however, for several reasons. Most important is the canyon itself. The strong visual drama of the canyon and the river demands the attention of viewers on the canyon floor and holds their visual focus predominantly within the canyon. This short visual focus effect is enhanced by the nature of the river which is rated "very difficult" (Class IV according to the Standard River Rating System) through the segment with views of the proposed westerly dam. Boaters would be concentrating on the river much more than on scenery outside the canyon. Nevertheless, the dam would be visible and the color contrast would attract some attention.

Effects on views from KOP 3, southwest of Questa, would not be considered significant. The easterly dam would be visible to viewers on SR 533 but would not dominate their views because of the visual strength of the existing tailings facilities and other obvious human activities. The elevation of the proposed dam some 800 feet above the existing facilities would attract viewer attention primarily because of color contrast with woodlands on Guadalupe Mountain. It would not violate the intent of the VRM Class III objective applicable on the east face of the mountain, however.

3.11 Noise

Sources of noise from construction of the proposed westerly dam would include rock drilling, blasting, loading and hauling of rock, rock placement and compaction, and watering to reduce dust emissions. It was assumed for analytical purposes that these activities would be clustered at the center of each dam, a conservative assumption as a substantial

TABLE 3-8

MAJOR NOISE SOURCES

Equipment Roster		Maximum Noise Emission Level Per Unit (dBA)	Total Units
Type	Size		
Front-end Loader	10 - 12 yards	88	1
Scraper	85 ton	88	3
Rotary Drill	7 to 9 inches	98	1
Dozer	330 HP	88	1
Water Truck	10,000-gallon	88	1
Miscellaneous Vehicle	3/4 ton	75	2

Sources: U.S. EPA 1971, CERL 1978, ERT file data.

TABLE 3-9

PROJECT-RELATED NOISE

Sensitive Receptor	Levels (dBA)	
	Background	With Project[1]
Sheep Crossing Campground	40	46.0
Chiflo Campground	40	45.3
Questa	40	43.2

[1]As defined in the text, these are estimated worst-case noise levels.

amount of activity is likely to take place higher in the saddle of Guadalupe Mountain. Table 3-8 provides a roster of major noise-emitting equipment for each dam, together with maximum noise emission levels for each unit of equipment. The combined noise emission level for the activity at each dam is estimated at slightly under 101 dBA at a reference distance of 50 feet.

Emission levels are considered to be conservative (worst-case) because they are based on the high end of measured ranges for each unit of equipment (U.S. EPA 1971). The combined emission level thus presumes that all equipment at each dam would be operating simultaneously and continuously at maximum output. These extreme conditions would rarely, if ever, occur. Consequently, the results of the noise analysis would be considered worst-case; the average project noise emissions would be less than the levels indicated in the analysis.

The noise impact analysis calculated noise attenuation (reduction) from two factors in the project area: spreading of sound waves over distance and atmospheric absorption. The results of the noise analysis are illustrated in Table 3-9. Assuming an ambient level of 40 dBA, the projected worst-case noise level from construction activity is estimated to 46.0 dBA at the Sheep Crossing Campground. This would be a noticeable increase but would not be sufficient to disrupt conversation at normal speech levels up to about 20 feet (Harris 1979). Construction activity would be limited to daytime hours so sleep disruption would not be an important consideration. Projected noise levels at Chiflo Campground and in the center of Questa would be slightly lower than at Sheep Crossing Campground.

The noise analysis does not quantitatively consider blasting noise beyond the work done by NMEID in 1982 because the impulsive nature of blasting noise and the limited amount of blasting required would have little if any effect on the quantitative noise results presented above. NMEID's work (Orton 1982) indicates blasting noise would be below ambient levels at the campgrounds. While this may be, it seems likely that some combination of noise and vibration would be perceptible at the campgrounds less than 2 miles away. Blast noise would be disruptive to some recreational activities in the area.

3.12 Cultural Resources

Criteria used to establish whether or not adverse impacts would occur at archaeological sites can be found at 36 CFR 800.9. These regulations which implement the National Historic Preservation Act elaborate upon the criteria of effect and adverse effect which are used to evaluate the impacts proposed actions might have upon cultural resources. These regulations state:

> "(a) An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register. For the purpose of determining effect, alteration of features of the property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered.
>
> (b) An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include,but are not limited to:
>
> (1) Physical destruction, damage, or alteration of all or part of the property;
>
> (2) Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
>
> (3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
>
> (4) Neglect of property resulting in its deterioration or destruction; and
>
> (5) Transfer, lease, or sale of the property.
>
> (c) Effects of an undertaking that would otherwise be found to be adverse may be considered as being not adverse for the purpose of these regulations:
>
> (1) When the historic property is of value only for its potential contribution to archaeological, historical, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and such research is conducted in accordance with applicable professional standards and guidelines;

(2) When the undertaking is limited to the rehabilitation of buildings and structures and is conducted in a manner that preserves the historical and architectural value of affected historic property through conformance with the Secretary's "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings"; or

(3) When the undertaking is limited to the transfer, lease, or sale of a historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant historic features.

Eleven archaeological sites (LA-38422 - 38432), located within the Guadalupe Mountain basin, are considered eligible for nomination to the National Register of Historic Places (NRHP). As a result of the construction of the tailings disposal facility, these sites would all be adversely affected from activities associated with construction, operation, and reclamation. Clearing, grading, topsoil removal, and excavation of fill material for construction of dams, pumping stations, pipelines, roads, and power lines are planned. This ground disturbance would physically damage individual artifacts and features and would destroy the spatial integrity of the archaeological sites. Those sites not immediately destroyed by construction activities would be buried by the tailings themselves. Thus, they would be sealed under a deep layer of sediments, and access to and study of these resources would be effectively denied. Long-term effects of the leaching action from the minerals placed on top of the archaeological sites would likely compromise archaeological paleosol, pollen, radiocarbon, and other types of analyses.

Determination of no adverse effect, however, can be reached if the sites are mitigated according to the data recovery plan (Vierra 1984). Phase I of this Mitigation Plan will be implemented in 1989. A description of this mitigation can be found in Appendix E.

At the conclusion of the mitigation in 1989, the necessity of Phase II excavation will be evaluated based on the results of Phase I data recovery. Phase II will be implemented if Phase I analysis determines that buried features and/or buried stratified cultural deposits exist beneath the surface of the archaeological sites.

3.13 Socioeconomics

This section evaluates the beneficial and adverse effects of the proposed Molycorp tailings disposal facility. The project-generated impacts are related to the present overall economic picture of the area, including the current high level of unemployment in Taos County (25 percent), the related low level of tax revenues to support local government jurisdictions, and low levels of personal incomes associated with low paying employment.

Population in Taos County is not expected to increase due to the proposed project. The projected construction workforce for the tailings dam site is approximately 30 workers. The construction schedule is dependent on improved conditions in the molybdenum market. Initial construction activity would require 18 months to complete. It is anticipated that the workforce would be comprised of some of the 15 current Molycorp employees. The remaining workforce would be made up of local labor including some persons employed in the mining sector prior to its slowdown in 1986. The operations of the tailings dam would require approximately 30 workers.

3.13.1 Economy and Employment

The direct economic effects of the construction of the tailings dam would be minimal. The 30 jobs associated with construction would reduce unemployment in Taos County by less than 1 percent. The tailings dam construction would extend the potential life of mining sector jobs; however, the economic conditions of the mining sector would have to improve and activate the potential for extended job life.

3.13.2 Public Fiscal Conditions

The capital expenditures for the proposed tailings dam are estimated at $8.3 million over a 36-month period. During the 18-month actual construction period, $7.3 million would be expended of which approximately $1.6 million would be payroll. The construction would contribute to the net revenue of Taos County and the Questa School District in the form of gross receipts taxes and personal property taxes. Gross receipts taxes are paid on labor and equipment during the

construction period. Personal property taxes are paid on equipment owned and operated by Molycorp during tailings disposal operations. County-wide assessed valuation would increase. The tailings dam construction would have little effect on local government expenditures and, consequently, would result in a net fiscal benefit to the county.

No new residential or commercial development is anticipated due to dam construction, however, the increase in payroll during construction would contribute to increased sales tax receipts within the towns of Taos and Questa.

3.13.3 Housing and Public Services

Adequate housing and public services and facilities exist throughout the region. No impacts from tailings dam construction are anticipated for schools, police, fire protection, social services, water and sewer systems, or other public services.

3.14 Health Risk Assessment

An initial health risk assessment was completed to address the potential health effects associated with exposure to windblown tailings dust from the Molycorp tailings facility on area residents and Questa High School students and faculty. This assessment focuses on the respirable-sized fractions of the tailings dust, which represents particulate matter less than 10 microns nominal diameter and is designated PM-10 (see also Section 3.2, Air Quality, for further discussion of the PM-10 standard). The federal PM-10 standard is 150 $\mu g/m^3$ (24-hour averaging time).

This conservative assessment is based on the predicted maximum air quality impact levels shown in Table 3-2 for the PM-10 material of 60 $\mu g/m^3$ (24-hour averaging time). This was the maximum concentration predicted to occur at the Molycorp property boundary surrounding the proposed tailings facility. The predicted PM-10 concentrations that would occur at Questa High School and the Town of Questa were 3 and 8 $\mu g/m^3$, respectively (Table 3-3). The 60 $\mu g/m^3$ level is 20 and 7.5 times the exposure levels predicted at these two receptors. The purpose of using the worst-case exposure level was to provide an additional margin of safety in the analysis.

The Threshold Limit Values (TLVs), which regulate occupational exposures, provide the basis of this risk assessment. The Occupational Health and Safety Administration (OSHA) has determined that TLVs are effective in protecting workers. OSHA's TLV protective criterium is to protect workers who are exposed to the TLV concentration 8 hours each day, for 5 days each week over a working life time (45 years). In order to account for differences between the general population and the work force, and for the potentially continuous exposure (24 hours/day), a thousand-fold safety margin was incorporated into the standard.

A second consideration in this risk assessment was a comparison of the chemical composition of the Molycorp tailings dust with the chemical composition of average soils present in the western United States. The data for this comparison are presented in Table 3-10. Only three chemicals that are associated with potential health effects (lead, molybdenum, and selenium) are present at higher concentrations in the tailings dust as compared to "average" soils. The other potentially harmful metals are not present at significant concentrations compared to average soils.

The maximum potential human exposure concentrations for areas immediately adjacent to the tailings facility are given in Table 3-11. It is important to recall that these concentrations are 20 and 7.5 times higher than the highest exposures that would be expected at Questa High School or the Town of Questa. The first column in Table 3-11 gives the concentration of specific metals in the tailings dust; the second column gives the maximum concentration in the air of each metal (e.g., the maximum exposure to molybdenum would be 0.08 $\mu g/m^3$). The OSHA TLV divided by 1,000, in the third column, shows that an acceptable "no effects" level for molybdenum as defined earlier would be 5.0 $\mu g/m^3$ of air. The last column gives the maximum exposure level as a percent of the TLV/1,000 for each specific chemical. In the case of molybdenum, the maximum exposure level from the tailings dust is only 1.6 percent of the TLV/1000. The same type of comparison can be made for any of the tailings dust constituents.

It is concluded from the risk assessment that the chemical constituents in the Molycorp tailings dust as listed in Table 3-10 are not present in high enough concentrations to pose a health threat to

TABLE 3-10

COMPARATIVE TRACE METAL CONCENTRATIONS

(IN PARTS PER MILLION)

	Molycorp Tailings	Soils of Western United States[1]	
		Mean	Normal Range Mean ± 1 SD[2]
Aluminum (Al)	>10,000	58,000	29,000-116,000
Arsenic (As)	2.7	5.5	2.8-10.9
Barium (Ba)	740	580	337-998
Cadmium (Cd)	0.3	0.2	0.1-0.5
Chromium (Cr)	87	41	19-90
Cobalt (Co)	8.9	7.1	3.6-14.0
Copper (Cu)	94	21	10-43
Iron (Fe)	>10,000	21,000	10,800-41,000
Lead (Pb)	180	17	9-31
Manganese (Mn)	490	380	192-752
Molybdenum (Mo)	130	0.85	0.39-1.85
Nickel (Ni)	5.6	15	7-32
Selenium (Se)	4.7	0.23	0.09-0.56
Silver (Ag)	5.5	0.2	0.1-0.5
Uranium (U)	2.3	2.5	1.7-3.6
Vanadium (V)	50	70	36-136
Zinc (Zn)	98	55	31-98

[1] Data from Shacklette, H. T., and Boerngen, J. G. 1984. Element Concentrations and Other Surficial Materials of the Coterminous United States. U.S. Geological Survey Professional Paper 1270. 105 pp. The means and standard deviations are geometric to account for log normal distributions.

[2] SD = Standard Deviation

TABLE 3-11

MAXIMUM POTENTIAL HUMAN EXPOSURE AT TAILINGS DISPOSAL FACILITY

Element	Concentration in Dry Tailings (ppm)	Concentration ($\mu g/m^3$)		
		Maximum Concentration in Air PM-10 24-hr[1]	Occupational TLV/1,000[2]	Maximum Exposure as a % of TLV/1,000
Arsenic	2.7	0.0002	0.2	1.00
Cadmium	0.3	0.00002	0.05	0.40
Chromium	87	0.005	0.05	10.00
Cobalt	8.9	0.0005	0.1	0.50
Lead	180	0.01	0.15	6.67
Molybdenum	130	0.08	5.0	1.60
Selenium	4.7	0.0003	0.2	0.15
Uranium	2.3	0.0001	0.2	0.10
Vanadium	50	0.003	0.05	6.00
Cyanide	0.4	0.00002	5.0	0.0004
Silver	5.5	0.0003	0.1	0.30

[1] Table 3-2 shows that the maximum 24-hr PM-10 tailings contribution would be 60 $\mu g/m^3$. The maximum concentration in this column was calculated assuming the air contained 60 $\mu g/m^3$ of less than 10-micron tailings dust.

[2] The TLV divided by 1,000 is assumed to represent a conservative environmental exposure level for general populations.

humans at sensitive locations near the Guadalupe Mountain tailings facility. This conclusion is based on a comparison of the relative concentrations of trace metals in the tailings and typical western United States soils and OSHA's TLVs in conjunction with a 1000-fold safety factor. In addition, the worst-case exposure level was used in all calculations rather than the significantly lower exposures expected at "sensitive" locations.

3.15 Required Mitigation and Monitoring Measures

As a result of the impact analysis presented above, the following mitigation measures have been developed. These mitigation measures will be specific requirements of Molycorp as part of their Plan of Operations. Implementation of these mitigation measures will not completely eliminate all potential impacts. This will result in unavoidable adverse impacts that are discussed in Section 3.17. Monitoring measures that would be required as part of permit compliance are also provided below.

Air Quality

- Predicted TSP exceedances would be mitigated by use of a chemical surfactant or bonding agent applied to areas of dried tailings to reduce wind blown dust. Molycorp has specified the use of a surfactant in their Plan of Operations, however this mitigation measure requires that the surfactant be applied at frequent intervals to eliminate or minimize exceedances to the New Mexico state air quality standards.

Water Resources

- Requirements for protection of surface waters discharged by the project will be met as provisions of the U.S. Environmental Protection Agency's NPDES permit.

- Groundwater would be protected by construction and operation design considerations incorporated into the Plan of Operations (see Chapter 1). New Mexico Environmental Improvements Division (EID) must review and approve Molycorp's Groundwater Discharge Plan and would specify any necessary changes in construction or operation design.

Final Engineering

- Molycorp must submit detailed engineering design to the New Mexico State Engineer for approval prior to construction of the tailings impoundment and associated facilities (pipeline,

decant channel, etc.). In addition BLM will also require review and approval of final detailed engineering as a stipulation to approval of the Plan of Operations.

Vegetation

- Reclamation of the tailings area at facility closure will require capping with topsoil and planting with an appropriate seed mixture. Molycorp has committed to a minimum of 1 foot of topsoil for capping. This mitigation measure requires that Molycorp develop a revegetation plan prior to closure and cap tailings with sufficient topsoil so that revegetation with selected native plant species meets criteria for species composition and cover comparable to native vegetation in the area.

- In addition, Molycorp's final revegetation plan would require that sufficient topsoil be used and adequate testing be performed to ensure that there would be no detrimental uptake of potentially toxic material through the food chain.

- BLM will require a performance bond to ensure compliance with reclamation and other mitigation measures. The specific bonding requirements will be determined prior to approval of the Plan of Operations.

Wildlife

- The inverted umbrella wildlife watering device currently located on the project site will be dismantled, removed, and reinstalled by Molycorp. The new location will be selected by BLM and will be determined based upon proximity and need.

Visual Resources

- In order to reduce visual impacts and preserve habitat privacy, any unnecessary removal of trees or vegetation, or removal of construction material will not be allowed on the west side of Guadalupe Mountain.

- Visual impacts of the two rock-filled dams will be partially mitigated by seeding with native grasses and rapidly growing shrubs and forbs on the dam faces. Seeding with an approved mix will occur immediately following each dam lift stage. The purpose of the revegetation will be to minimize color and texture contrast with adjacent naturally wooded slopes. Trees and deep rooted plants will not be permitted for dam safety reasons but some shrub species (e.g., four-wing, rabbitbrush) would probably be acceptable (Ferns 1988). The seed mix will be approved by the BLM for color blending and the State Engineer's office for safety considerations. Molycorp will ensure that the revegetation effort is successfully established.

- Any man-made structures will be mitigated in accordance with Class II visual resource management guidelines, which require that any change in the basic elements (form,line, color, and texture) caused by a proposed activity will not be evident in the characteristic landscape. Contrasts may be seen, but will not attract attention. Earth-tone colors will be used in all necessary painting of structures, and placement will follow the natural contour of the terrain.

Noise

- In order to mitigate potential excessive noise that would impact visitors at the recreation area, a cooperative effort between the BLM and Molycorp will be in effect. Effort will be made to reduce, as much as possible, the noise levels at the recreation area to a recommended level of 50 decibels, and maintain the natural sounds of the wild river. This level will be monitored and maintained from the Chiflo campground. Specific mitigation measures to be used include the following:

  - All blasting and construction work at the site from May through October, will be done during weekday periods between the hours of 8 a.m. and 6 p.m.

  - During the fall and winter months, blasting will be done between 12 noon and 6 p.m. to avoid the sharp noise levels caused by air inversions over Guadalupe Mountain.

  - To reduce road surface wear and vehicle noise on the road to the recreation area (west side of Guadalupe Mountain), all access for construction vehicles to the new tailings disposal site will be limited to the east side of Guadalupe Mountain.

  - Vegetation disturbance between the west dam face and the recreation area will be minimized to maintain noise absorption between the source and the listeners.

Cultural

- A cultural resources mitigation implementation plan for the Guadalupe Mountain site has been developed by the BLM and New Mexico State Historic Preservation Office. This plan is attached to the Draft EIS as Appendix E. The objectives of the plan include site boundary definition, surface collection, subsurface examination, and analysis of collected materials.

Land Use

- Prior to site clearing, BLM will conduct timber or firewood sales to allow salvage of commercial wood products. During clearing Molycorp will cut and stack firewood-sized wood wastes and make that material available to the public.

3.16 Unavoidable Adverse Impacts

Following implementation of the mitigation measures described in Section 3.15, the following unavoidable adverse impacts associated with the construction, operation, and abandonment of the proposed project would remain. The impacts are considered significant in that they result in exceedances of established standards.

Air Quality

During periods of high winds, there is a potential for concentrations of TSP to infrequently exceed State of New Mexico short-term standards in the immediate vicinity of the tailings pond when dry. These impacts would be considered a nuisance rather than a public health hazard.

Visual Resources

Significant adverse visual effects from the proposed project would not be completely mitigable because of engineering safety prohibitions against tree planting on the dam faces and because the time period between construction of the series of dam lifts would not be sufficient to allow plant materials to mature.

3.17 Irreversible and Irretrievable Commitment of Resources

Construction and operation of Molycorp's proposed Guadalupe Mountain Tailings Facility project would result in the irreversible and irretrievable commitment of certain resources. An irreversible commitment of a resource is one that cannot be changed once it occurs; an irretrievable commitment means that the resource cannot be recovered or reused.

Topography/Geology

The changes in landforms due to the creation of the tailings dams and buildup of the tailings would be irreversible. While reconstruction of previous landforms is technically possible, such a measure would be economically unfeasible.

Soils

Approximately 717 acres of soils would be covered by the tailings facility. This soil would be irretrievably lost.

Vegetation

Productivity of the area covered by the tailings facility would be irreversibly lost for the life of the project. Approximately 325,000 board feet of timber and 2,886 cords of wood would be removed from the project area, but would be sold or made available to the public as fire wood.

Visual Resources

The proposed changes in land forms that would result from the dams and tailings pond would cause changes that would be economically unreasonable to reverse. These facilities would irreversibly change the visual character of the landscape.

Cultural Resources

Construction of the proposed project may result in the excavation or burial of cultural resources. The loss of integrity of the sites would be an irreversible and irretrievable commitment of resources.

3.18 Long-Term Versus Short-Term Uses of the Environment

Short-term is defined as the life span of the proposed project, plus one-year of final reclamation; this would equal approximately 41 years. Long-term is defined as the future after final reclamation.

Air Quality

The proposed project would involve short-term increases in total suspended particulate (TSP) levels in the region during operation of the project. Project emissions would not violate federal air quality (PM-10) regulations or standards. Exceedances of State TSP standards may occur infrequently. In the long-term, after closure, emissions due to the proposed project would cease and there would be no long-term effect on air quality.

Topography/Geology

The construction and operation of the tailings facility would permanently (long-term) alter the topography.

Water Resources

No significant short or long-term impacts to water resources are anticipated. Seepage of tailings liquid out of the tailings pond would occur, but available data and detailed impact analysis indicate that water quality of the groundwater and local surface water would not be significantly affected.

Soils

Soils that would be buried under the tailings facility would be lost over the long term; however, adequate soil resources are available elsewhere for use in reclamation. No significant short or long-term impacts to soil resources have been identified.

Vegetation

Vegetation production would be lost during the short-term on 825 acres and woodland would be harvested for timber. Assuming successful reclamation, no long-term impacts to vegetation resources have been identified.

Wildlife

Project-related impacts to vegetation and wildlife habitat would result in a short-term reduction in wildlife locally. Assuming successful reclamation, there would be no long-term effect on the productivity of wildlife resources. Wildlife species of concern or crucial habitats would not be adversely affected.

Land Use

Temporary loss of forage and change in grazing patterns could alter BLM grazing allotment plans. Long-term productivity would not be impaired. Removal of timber would be a short-term impact. Following abandonment and reseeding productivity would eventually be restored.

Recreation

During the short and long term, there would be a reduction in recreational access to the Guadalupe Mountain saddle area.

Visual Resources

Significant impacts to visual resources would result for both the short term and the long term as a result of the tailings facility dams.

Noise

The proposed project would result in short-term noise impacts during construction. No long-term noise impacts would occur.

Cultural Resources

Additional information gained during project surveys for cultural resources sites would add to knowledge of the area's history. Disturbance of cultural resource sites would result in a loss of site integrity.

Socioeconomics

Short-term (beneficial), socioeconomic impacts would result from the proposed project. No long-term impacts are anticipated.

4.0 CONSULTATION AND COORDINATION

4.1 Scoping Process

A public scoping document for the Guadalupe Mountain Tailings Facility EIS was prepared by the BLM in July 1986. The scoping document provided a brief description of the project, a summary of the scoping process, a preliminary identification of the issues, and a form that could be used for submittal of written comments. The scoping document was mailed out to approximately 65 interested individuals, groups, and agencies, and was also distributed to attendees at the public scoping meetings. It was requested in the scoping document that all written and verbal comments on the scope of the environmental analyses for the project be received by August 22, 1986.

Public scoping meetings were held at the following locations:

- Taos - Kachina Lodge, July 22, 1986
  1:00 to 3:00 p.m. - 32 attendees
  7:00 to 9:00 p.m. - 53 attendees

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  1:00 to 3:00 p.m. - 52 attendees
  7:00 to 9:00 p.m. - 43 attendees

Representatives from the BLM, Molycorp, Unocal, and ERT were present at each of the scoping meetings. A total of 180 persons attended the four sessions of the scoping meetings. The BLM received 130 copies of a form letter in support of Molycorp's project. Subsequent to the meetings, 23 written comments were submitted to the BLM. Thirteen of the written comments were from private individuals; the following agencies and groups also provided written comments:

- State of New Mexico
  - Environmental Improvement Division
  - Department of Game and Fish
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- New Mexico Institute of Mining and Technology
- Town of Taos
- Taos County Commission
- Taos County Chamber of Commerce
- Village of Questa
- Kit Carson Electric Cooperative, Inc.
- Questa Health Center, Presbyterian Medical Services

The concerns and issues that were presented verbally at the scoping meetings or received in the written comments were assigned, as appropriate, to one of the following four categories:

1. Items to be addressed in the EIS;
2. Items that are determined to be outside the scope of the EIS;
3. General comments that will be considered in preparation of the EIS; and
4. Comments that will be addressed in a public information document to be prepared by the BLM.

In December 1986, the BLM distributed a public information document to approximately 225 interested persons. The public information document included a detailed summary of scoping results, BLM responses to selected comments received during scoping, and the BLM Field Solicitor's opinion on concerns regarding future patenting of the Guadalupe site. These items are attached as Appendix A to the Draft EIS. Correspondence for both Section 7 (U.S.D.I. FWS) and Section 106 (Cultural Resources) consultation are provided in Appendices C and D, respectively.

4.2 Interested Agencies, Groups, and Businesses

The following agencies, groups, and businesses have provided input and/or will receive copies of the Draft EIS.

Federal Agencies

Department of the Interior
Bureau of Land Management
Fish and Wildlife Service

State Agencies

New Mexico Employment Security Department
New Mexico Environmental Improvement Division
Groundwater Section
New Mexico Game and Fish Department
New Mexico Health & Environment Department
New Mexico State Department of Economic Development and Tourism
New Mexico State Department of Finance and Administration
Local Government Division
New Mexico State Department of Taxation and Revenue
University of New Mexico, Bureau of Business and Economic Research

County Agencies

Taos County Assessor's Office
Taos County Department of Economic Development
Taos County Finance Director's Office
Taos County Housing Authority
Taos County Human Services Department
Taos County Planning Department
Taos County Sheriff Department

Local Agencies

Questa School District
Town of Taos Police Department
Village of Questa
    Mayor of Questa
    Public Administrator's Office
    Utilities Director's Office

Other

CDK Contracting
Pioneer Real Estate
Rael Realty
Sierra Club
Taos Property Management

5.0 LIST OF PREPARERS FOR THE MOLYCORP TAILINGS DISPOSAL FACILITY EIS

Name	Education/Experience	EIS Responsibility
Bureau of Land Management		
Kent Hamilton Albuquerque District Office	B.S. Agricultural Economics 27 Years Professional Experience	BLM Team Leader Project Coordination Socio-Economics
Tim L. Sanders New Mexico State Office	B.S. Wildlife Biology M.S. Agricultural Economics 9 Years Professional Experience	Interdisciplinary Review Team State Office Coordination
Dan Wood Taos Resource Area Office	B.S. Forestry 15 Years Professional Experience	Interdisciplinary Review Team Taos Resource Area Coordination
Scott F. Archer Colorado State Office	B.S. Chemistry and Environmental Science 11 Years Professional Experience	Interdisciplinary Review Team Air Quality
Ben Kuykendall Taos Resource Area Office	B.S. Wildlife/Fisheries Biology 14 Years Professional Experience	Interdisciplinary Review Team Wildlife
Tom Mottl Taos Resource Area Office	B.A. Chemistry M.S. Watershed Science 11 Years Professional Experience	Interdisciplinary Review Team Recreation, VRM and Hydrology
Charles Pettee New Mexico State Office	B.S. Aeronautical Engineering M.S. Watershed Science 12 Years Professional Experience	Interdisciplinary Review Team Groundwater

LIST OF PREPARERS (CONTINUED)

Name	Education/Experience	EIS Responsibility
Paul Williams Taos Resource Area Office	B.A. Psychology M.A. Anthropology 7 Years Professional Experience	Interdisciplinary Review Team Cultural
Gary Wood Albuquerque District Office	B.S. Range Science 16 Years Professional Experience	Interdisciplinary Review Team Vegetation and Soil
Joe Mirabal Taos Resource Area Office	B.S. Geology 9 Years Professional Experience	Interdisciplinary Review Team Geology
Alan Hoffmeister Albuquerque District Office	B.S. Forest Science 12 Years Professional Experience	Interdisciplinary Review Team Public Participation
ERT		
Robert Sanz Project Manager	B.S. Zoology 15 Years Professional Experience	EIS Manager; Coordination, Planning, Quality Review, Agency Liaison
Sophie Sawyer Assistant Project Manager and Technical Editor	M.Ed. Science Education B.A. Biology 10 Years Professional Experience	EIS Preparation, Quality Review, Coordination of Technical Studies, Project Coordination, and Editing of EIS Sections
Jennifer Kathol Technical Specialist	B.S. Natural Resource Economics 11 Years Professional Experience	Socioeconomics

LIST OF PREPARERS (CONTINUED)

Name	Education/Experience	EIS Responsibility
Bill Theisen Technical Specialist	M.S. Recreation Resources B.S. Natural Resources 6 Years Professional Experience	Land Use/Recreation
Bernhard E. Strom Technical Specialist	M.C.R.P. City and Regional Planning B.S. Urban Planning 16 Years Professional Experience	Visual/Noise
Lori Langston Technical Specialist	B.S. Wildlife Ecology and Management 4 Years Professional Experience	Terrestrial and Aquatic Wildlife
Philip Hackney Technical Specialist	M.S. Candidate Range Ecology B.S. Botany 11 Years Professional Experience	Soils, Vegetation, and Geology
Christine Renda Technical Specialist	M.S. Hydrology B.S. Geology 8 Years Professional Experience	Hydrology
D. Howard Gebhart Technical Specialist	M.S. Meteorology B.S. Professional Meteorology 10 Years Professional Experience	Air Quality

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GLOSSARY

Alluvium - An unconsolidated terrestrial sediment composed of sorted or unsorted sand, gravel, and clay that had been deposited by water.

Andesite - Very finely crystalline extrusive rock of volcanic origin.

Animal Unit Month - The amount of forage required by a cow and a calf for 1 month. This unit is used to calculate carrying capacity and serves as a basis for grazing fees.

Anisotropic - Showing different properties as to velocity of light transmission, conductivity of heat or electricity, compressibility, etc., in different directions.

Aquitard - The less permeable beds in a stratigraphic sequence.

Arroyo - A water-carved gully or channel.

Basalts - Fine-grained, dark, molten rock composed largely of plagioclase feldspar and pyroxene.

Benthic - Bottom dwelling

Calcareous - Resembling, containing, or composed of calcium carbonate.

Carrying capacity - The number of individual organisms the resources of a given area can support, usually through the most unfavorable period of the year.

Dacites - Very fine crystalline or glassy rock of volcanic origin.

Decant - To draw off a liquid without disturbing the underlying sediment or precipitate, or the lower liquid layers.

Deionization - Removal of ions from solution by a chemical means.

Eolian - Pertaining to or deposited by wind.

Eyrie - The nest of a bird on a cliff or mountain top.

Hydraulic conductivity - The rate of water flow in gallons per day through a cross section of 1 square foot under a unit hydraulic gradient, at the prevailing temperature or at 60°F (16°C).

Inclusion - A portion of older rock enclosed in igneous rock.

Lithology - The systematic description of rocks, in terms of mineral composition and texture.

Loam - Soil mixture of sand, silt, clay, and humus.

Olivine - A greenish mineral that is a complex silicate of magnesium and iron.

Overburden - Material of any nature that overlies a mineral deposit or coal seam.

Perennial - Present at all seasons of the year; continuing to live from year to year.

Permeability - The ability of a formation to transmit groundwater or other fluids through pores and cracks.

Permeable - Having pores or small openings that permit liquids or gases to seep through.

Rhyodacite - A group of extrusive porphyritic igneous rocks containing a fine-grained to glassy groundmass composed of alkali feldspar and silica minerals. Also known as quartz lattice.

Spoil - The overburden or non ore-bearing material from a mine.

Tailings - The refuse material resulting from processing ground ore.

Tectonic - Pertaining to regional structural and deformational features of the earth's crust.

LIST OF ACRONYMS

ACEC - Area of Critical Environmental Concern
AUM - Animal Unit Month
BLM - Bureau of Land Management
cfs - cubic feet per second
dBA - decibels, A-weighted
EA - Environmental Assessment
EIS - Environmental Impact Statement
EPA - Environmental Protection Agency
ISC - Industrial Source Complex
KOP - Key Observation Point
μg - micrograms
MSHA - Mine Safety and Health Administration
NEPA - National Environmental Policy Act
NMEID - New Mexico Environmental Improvement Division
NPDES - National Pollution Discharge Elimination System
OSHA - Occupational Health and Safety Administration
PM - particulate matter
PPM - parts per million
PSD - Prevention of Significant Deterioration
Q/s - Specific capacity
RCRA - Resource Conservation and Recovery Act
RMP - Resource Management Plan
SCS - Soil Conservation Service
SHPO - State Historic Preservation Office
SMA - Special Management Area
SR - State Route
T - transmissivity
TDS - total dissolved solid
TLV - threshold limit value
TPD - tons per day
TPVF - Taos Plateau Volcanic Field
TSP - total suspended particulate
USDA - U.S. Department of Agriculture

USDI - U.S. Department of the Interior

USGS - U.S. Geological Survey

VRM - Visual Resource Management

APPENDIX A

SCOPING SUMMARY DOCUMENTATION

IN REPLY REFER

3809 (014)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
435 Montano N.E.
Albuquerque, New Mexico 87107

DEC 05 1986

Dear Reader:

This is the first of several public information documents planned to keep concerned parties informed regarding the Bureau of Land Management's efforts to analyze the impacts for Molycorp's proposed tailing disposal facility on Guadalupe Mountain located northeast of Questa, New Mexico. Molycorp, Inc. has filed a Plan of Operation to develop a molybdenum tailings disposal facility located on its 266 mill site claims. The BLM is currently preparing an Environmental Impact Statement (EIS) through the services of ERT, a Resource Engineering Company. This first information document will contain information on various aspects of the EIS, including:

-A scoping summary document,

-BLM's response to several questions raised during the public meetings,

-Discussions on where we are now and planned actions regarding this EIS, or

-Discussion on an extension of the EIS schedule.

All comments, thoughts and concerns received at the July, 1986, public meetings and during the written comment period were forwarded to ERT, the EIS contractor. ERT has prepared a scoping summary document which incorporates the verbal and written public scoping comments. The scoping summary document is attached (Enclosure 1). The public comments contained in the scoping summary document have been assigned to one of the following four categories:

1. Items to be addressed in the EIS;

2. Items that are determined to be outside the scope of the EIS;

3. General comments that will be considered in preparation of the EIS; or

4. Comments that will be addressed in a public information document to be prepared by the BLM.

Category four contains unanswered questions raised during the public meetings. Our responses to these questions are attached (Enclosure 2).

Also during the public meetings, a concern was expressed regarding BLM's enforcement authority and responsibilities after Plan of Operation approval, and subsequent patenting of the tailing disposal site. In response to this

question, we requested a Department of Interior Solicitor's Opinion. Our request and the Solicitor's Opinion are attached (Enclosure 3).

Following public scoping, the scoping comments were also analyzed to determine whether any new issues or concerns were raised which should be included in the EIS. Health risks associated with inhalable silica and fugitive dust is a public concern which was not previously considered for inclusion in the EIS. Analysis of this issue in the EIS is currently being considered. We will inform you of our decision in the next public information document.

Also following public scoping, the data to be used in the EIS analysis was compiled for review. Concerns regarding the data for three of the EIS issues have surfaced as a result of the data reviews. The available meteorological data for the air quality issue has been determined to be inadequate to quantitatively assess impacts in the EIS. Additional meteorological data is currently being collected from Guadalupe Mountain to provide additional data for the EIS analysis. Meteorological data collection will continue through April, 1987. An error in the calculation of the data to be used for the groundwater analysis was detected during the review. As result of the error, the independent contractor who prepared the ground water report will prepare an amendment to the initial report. The amended report will be reviewed for adequacy and inclusion in the EIS analysis. In addition, the available socio-economic data is currently being considered for revision. The decision on the revision of the socio-economic data, and an update on the groundwater data analysis will be presented in a future public information document.

To allow for the collection of the additional meteorological data and other data needs, the publication of the Draft EIS will be delayed for six to eight months. A BLM-Molycorp-ERT meeting is planned in the near future, to discuss the air quality, groundwater and socio-economic data, to decide whether additional data should be collected to analyze the health risk associated with fugitive dust and inhalable silica, and to discuss the revision of the time schedule for preparation of the EIS. Following the meeting, another public information document will be prepared and sent out to complete discussions initiated in this document.

Additional update documents will be prepared as needed to keep everyone informed with progress in the EIS preparation. If you would like to continue to receive the public information documents and EIS's, when published, please complete the attached form and return it to this office.

If you have any questions regarding these matters, contact Gene Tatum of my staff at the above address or telephone (505) 761-4504.

Sincerely,

L. Paul Applegate

L. Paul Applegate
District Manager

Enclosures (3)

SCOPING SUMMARY FOR THE MOLYCORP

TAILINGS DISPOSAL EIS

A scoping document was prepared by ERT in July and submitted to Gene Tatum, BLM, Albuquerque for approval. The scoping document provided a brief description of the project, a summary of the scoping process, a preliminary identification of the issues, and a form that could be used for submittal of written comments. The scoping document was mailed out to approximately 65 interested individuals, groups, and agencies, and was also distributed to attendees at the public scoping meetings. It was requested in the scoping document that all written and verbal comments on the scope of the environmental analyses for the project be received by August 22, 1986.

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  1:00 to 3:00 p.m. - 32 attendees
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  - Department of Game and Fish
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- New Mexico Institute of Mining and Technology
- Town of Taos
- Taos County Commission
- Taos County Chamber of Commerce
- Village of Questa
- Kit Carson Electric Cooperative, Inc.
- Questa Health Center, Presbyterian Medical Services

The concerns and issues that were presented verbally at the scoping meetings or received in the written comments are summarized below. The comments have been assigned, as appropriate, to one of the following four categories:

1. Items to be addressed in the EIS;
2. Items that are determined to be outside the scope of the EIS;
3. General comments that will be considered in preparation of the EIS; and
4. Comments that will be addressed in a public information document to be prepared by the BLM.

The comments and concerns that will be addressed in the EIS include:

- The EIS should consider the direct and indirect impacts on employment opportunity and local economies if Molycorp must shutdown due to lack of storage area. (No Action Alternative.)
- The EIS should address cumulative impacts to air quality and water quality from existing and proposed ponds.
- Further analysis should be conducted on the tailings to determine any health hazards resulting from fugitive dust.
- The EIS should address any health problems in the community that may be related to dust or associated with inhalable silica.
- The EIS should address any health, visual, or water quality effects from the windblown dust.
- The EIS should address the adequacy of Molycorp's proposed reclamation plan.
- The chemicals used in the processing of molybdenum ore should be identified in the EIS.
- The EIS should examine potential effects on domestic water wells.
- The EIS should address pollution of the Rio Grande River by seepage from the site.
- Will the new pipeline system have spill containment areas? a spill prevention program?
- How will seepage be prevented? Will seepage collection avoid percolation to the springs? Will bottom sealing be necessary to avoid seepage?

- The EIS should provide a biological analysis regarding the dilution factors of process chemicals.
- The EIS should address impacts to water quality and aquatic organisms within the hydrologic regime.
- The EIS should describe the existing water quality in the area and address potential impacts to groundwater and surface water quality, as well as the springs.
- The EIS should address potential changes in return flow to the Red River.
- Concern about visual impact of the dams and possible effect of the visual impact on tourism.
- The Wild and Scenic River and Rio Grande Gorge Recreation Area may be affected by the project and qualities may be lost that attract people to the area.
- The EIS should address potential economic losses resulting from fewer visitors to the recreation area.
- The EIS should address the definition of "unnecessary and undue degradation" as cited in the Wild and Scenic River Act. In light of these requirements, the EIS must quantify any degradation in order to protect and maintain the values of the Wild and Scenic River.
- The EIS should analyze different options for establishing vegetation on the dam face during construction to minimize visual impacts (i.e., shallow rooted trees or seed the total built-up dam face initially).
- Mitigation measures for wildlife concerns should include limited access to the site.
- The EIS should address noise and visual impacts from the project.
- The EIS should address the broader issues of BLM land management responsibilities (wildlife, water quality, air quality, visual resources, noise, etc.).

The comments identified as being outside the scope of the EIS are presented below:

- The positive and negative effects of the project on private land values should be addressed.
- The EIS should address conditions at the existing tailings ponds, including dust control.
- Molycorp should proceed with their state groundwater discharge plan application as the EIS is being prepared.

The following general comments will be taken into consideration during preparation of the EIS:

- The EIS should not be totally dependent upon Molycorp's data.
- The amount of air quality monitoring data collected to date is insufficient for the EIS.
- Concern about the adequacy of air and water quality data collected during wet years.
- Concern that local "protectionists" will interfere with "best use of federal land" (mining purposes).
- Concern that the available groundwater data is inadequate for the EIS.
- Concern regarding Molycorp's past record of pipeline spills and further degradation to streams from future spills.
- Numerical standards must be set to define "unnecessary and undue degradation" since state or federal standards may not be stringent enough to protect the Wild and Scenic River.
- Concern that there is a lack of wildlife baseline data, especially site-specific, for the EIS.
- Mitigation for wildlife concerns should include incremental removal of vegetation during construction.
- BLM should act as quickly as possible in approving the project.
- The Village of Questa recommends relocating the site.

A public information document will be prepared by the BLM to address the concerns and comments presented below:

- The EIS should provide a detailed analysis of alternative sites.
- Why should there be further development when the mine is scaling down? Provide a realistic estimate of the existing storage capacity.
- The monitoring and enforcement of mitigating measures should be addressed in the EIS.
- A time table for reclaiming Sections 35 and 36, and Molycorp's efforts to date should be provided.

- The EIS should provide summaries of reports on geology and groundwater.

- The EIS should examine the worst-case (seasonal) significant levels of toxic substances.

- What control does BLM or other agencies have on the site if the land goes to patent? What happens to the control of mitigating measures if Molycorp sells to someone else before or after patent?

- Will the bonding requirements consist of a reclamation bond or a certificate of financial responsibility? Please provide a comparative analysis of the two types of reclamation guarantees.

- Does BLM have any statutory, regulatory, or legal authority to require reclamation once a patent is issued?

RESPONSES TO PUBLIC CONCERNS

1. The EIS should provide a detailed analysis of alternative sites.

Alternative site locations for the Guadalupe Site proposal will not be considered or analyzed in the EIS. Usually, alternative site locations to a given proposal are analyzed in the EIS process. However, under 43 CFR 3809.2-1(d), the BLM can only analyze the impacts resulting from the proposed action as described in the Plan of Operations submitted by the company. The Plan of Operations for the Guadalupe Site, submitted by Molycorp, does contain an analysis of other site locations which were evaluated by the company.

2. Why should there be further development when the mine is scaling down? Provide a realistic estimate of the existing storage capacity.

Molycorp, Inc. fully expects to re-open, and expand, their existing operations as soon as the Molybdenum market allows for production at profitable levels. When this occurs, there is only limited storage capacity (4 to 6 years) available for Molycorp to use in their existing ponds. This factor, plus planned expansion, requires Molycorp to actively seek additional storage capacity in the form of a new tailings disposal facility. Given the length of time involved in securing this new site, in addition to initial construction requirements, the company is trying to acquire this site as early as possible in order to prudently plan for the future.

3. The monitoring and enforcement of mitigating measures should be addressed in the EIS.

Please refer to the attached (Enclosure 3) response by the Department of Interior's Field Solicitor to the State Director, BLM, dated September 15, 1986, for a response to this concern.

4. A time table for reclaiming Sections 35 and 36, and Molycorp's efforts to date should be provided.

Sections 35 and 36 of the existing tailing's facility and their schedule for reclamation are not within the scope of this EIS and will not be addressed. This is now private laud belonging to Molycorp and any information pertaining to this concern should be directed to the company.

5. The EIS should provide summaries of reports on geology and ground water.

Reports on geology, hydrology or any other resource are part of the process records for the EIS and are available for review upon request. To avoid encyclopedic EIS's, which are expensive and cumbersome, these types of reports and information are not usually apart of the EIS itself.

6. The EIS should examine the worst case (seasonal) significant levels of toxic substances.

The EIS will discuss and present levels of any toxic substances found to be present in the tailings material.

7. What control does BLM or other agencies have on the site if the land goes to patent?

See response to No. 3 above.

8. Will the bonding requirements consist of a reclamation bond or a certificate of responsibility?

There are no bonding requirements that exist. See response to No. 3 above.

9. Does BLM have any statutory, regulatory, or legal authority to require reclamation once a patent is issued?

See response to No. 3 above.

United States Department of the Interior 3809 (934)

BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE
Post Office and Federal Building
P.O. Box 1449
Santa Fe, New Mexico 87504-1449

AUG 12 1986

Memorandum

To: Field Solicitor, USDI, Santa Fe, New Mexico

From: State Director, BLM, Santa Fe, NM

Subject: Concerns Regarding Future Patenting of Molycorp's Proposed Tailing Disposal Facility on Guadalupe Mountain

During the recent public scoping meetings for the EIS on Molycorp's proposed Molybdenum Tailings Disposal Facility, a great deal of public concern was expressed regarding BLM's enforcement authority on Molycorp's Plan of Operations, after its approval, and subsequent patenting of the tailing disposal site. Because of the sensitivity of this project, BLM shares many of the same concerns expressed by the public regarding our role in enforcing the Plan of Operations.

As you are aware, Molycorp, Inc., has claimed an area for tailings disposal on Guadalupe Mountain under the general mining laws. Molycorp prepared and submitted a Plan of Operations for this proposal to the BLM. The BLM subsequently prepared an Environmental Assessment on the proposal and determined that an EIS was needed to assess impacts and necessary mitigation to ensure the prevention of any unnecessary and undue degradation, prior to approval of the Plan of Operations. The existing Plan of Operations contains a description of the proposed project, mitigation measures, and eventual plans for reclamation. Upon completion of the EIS, a determination will be made to either approve, modify or deny the existing Plan of Operations. Upon approval of the Plan of Operations, Molycorp will begin construction of the tailings disposal facility on Guadalupe Mountain, which has an estimated life expectancy of 30 years.

Wording in the 43 CFR 3809 regulations implies that failure by an operator to follow an approved Plan of Operations, including mitigation and reclamation, would result in the issuance of a Notice of Noncompliance by the BLM. The regulations regarding noncompliance do not, however, distinguish between patented and unpatented lands.

In light of this direction, we are requesting an opinion on the following questions:

1. Upon BLM approval of Molycorp's Plan of Operations, how soon can Molycorp apply for patent? Do the patent procedures require Molycorp to apply for each of the 266 millsite claims individually, as they are used, or can Molycorp apply for the entire 1320-acre site at one time?

Enclosure 3-1

2. What enforcement authority, if any, does the BLM have over the Plan of Operations, including mitigation and reclamation, after patent? If BLM does possess enforcement authority over the approved Plan of Operations, would this authority apply to future mine owners upon Molycorp's divestment of its interests?

3. Finally, does the BLM have the authority to attach any covenants, reservations or reversionary clauses to the patent, in order to ensure full compliance with the Plan of Operations, including mitigation and reclamation?

MONTE G. JORDAN
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United States Department of the Interior

OFFICE OF THE SOLICITOR
Field Office, Southwest Region
P.O. Box 1042
Santa Fe, New Mexico 87504-1042

3809 (934)

REFERENCE NO.
BLM.SA.0153

September 15, 1986

MEMORANDUM

TO: State Director, Bureau of Land Management, Santa Fe, New Mexico

FORM: Gayle E. Manges, Field Solicitor
Southwest Region

SUBJECT: Plan of Operations and Patenting of Molycorp's
Proposed Tailing Disposal Facilty on Guadalupe Mountain

As requested by memorandum dated August 12, 1986, concerns exist as to the enforceability of an approved Plan of Operations filed by Molycorp for associated millsite claims or locations near Questa after such date as a patent might issue for the millsites.

The questions and responses are as follows:

1. Upon BLM approval of Molycorp's Plan of Operations, how soon can Molycorp apply for patent? Do the patent procedures require Molycorp to apply for each of the 266 millsite claims individually, as they are used, or can Molycorp apply for the entire 1320-acre site at one time?

I am unaware of any requirement for the need of approval by the Bureau of a Plan of Operation prior to acceptance by the Bureau of an application for patent. The Plan of Operation is required under 43 CFR 3809.1-4(a) and (b) for operations on federal lands as set forth therein. The filing of a Plan of Operation by the claimant or locator is not a requirement for the filing of a patent application by the proprietor of a mineral deposit.

The statutes and regulations are silent as to the acreage and number of millsite claims for which applications for patent may be filed so long as no claim exceeds five acres. An owner of a patented lode may file for an associated millsite "if good faith is manifest in its use or occupation in connection with the lode. . . ." 43 CFR 3864.1-1(b). There is no limitation or requirement for total acreage, Utah International, Inc., 36 IBLA 219 (1980), nor that a particular distance must exist between the millsite claims and the associated lode claims. See United States v. Parsons, 33 IBLA 326, 327 (1978). There is a requirement that the total acreage in the millsite or millsites must be reasonable for the mining and processing of minerals from the associated lode mining claim or claims. United States v. Swanson, 81 I.D. 14 (1974), Suppl. 34 IBLA 25 (1978), rev'd other grounds, Swanson v. Andrus, Civ. No. 78-4045 (D.Idaho June 3, 1982).

2. What enforcement authority, if any, does the BLM have over the Plan of Operations, including mitigation and reclamation, after patent? If BLM does possess enforcement authority over the approved Plan of Operations, would this authority apply to future mine owners upon Molycorp's divestment of its interests?

In my opinion, after the millsite claims are patented the Bureau has no enforcement authority over the Plan of Operations. The plan is required "to prevent unnecessary or undue degradation of Federal lands which may result from operations authorized by the mining laws." 43 CFR 380.9.0-1. "Federal lands" are lands subject to the mining laws including, but not limited to, public lands as defined in Section 103 of the Act of October 21, 1976, 43 U.S.C. § 1702 and 43 CFR 3809.0-5(c). After patent, the former Federal lands are private or non-Federal lands and no longer subject to 43 CFR Subpart 3809.

3. Finally, does the BLM have the authority to attach any covenants, reservations or reversionary clauses to the patent, in order to ensure full compliance with the Plan of Operations, including mitigation and reclamation?

In my opinion, no authority exists to attach such covenants to the patent or include reservations or reversionary clauses in the patent as to mitigation and reclamations requirements. The mining laws, 30 U.S.C. §§ 22 et seq., provide no authority for including such conditions or reservations in patents, and I am unaware of any federal statute or interpretations of existing mining law authorizing such inclusion.

Gayle E. Manges

APPENDIX B

WILDLIFE SPECIES LISTING

TABLE B-1

BENTHIC MACROINVERTEBRATES KNOWN TO OCCUR
IN THE BIG ARSENIC SPRINGS

Lepidoptera (aquatic moths)
Paragyractus sp.

Plecoptera (stonefly)
**Hesperoperla pacifica*

Ephemeroptera (mayfly)
Baetis sp.

Trichoptera (caddisflies)

Hydropsyche sp.
**Brachycentrus* sp.
**Micrasema* sp.
**Chimarra* sp.
**Wormaldia* sp.
Hydroptilidae A and B
**Hydroptila* sp.
**Helicopsyche* sp.

Coleoptera (beetle)
Elmidae

Hemiptera (true bugs)
Ambrysus mormon
Veliidae

Ostracoda (sea shrimp)

Amphipoda (scud/side swimmer)
Gammarus sp.

Diptera (True flies)

Snisononicae
Simuliidae
Stratiomys sp.
Odontomyia sp.

Odonata (damselfly)
Coenagrionidae

Turbellaria (flat worms)

Oligochaeta (round worms)
Tubificidae
Lumbriculidae

Mollusca (Snail)
Physa sp.

Source: BLM 1985.

*Uncommon; all other taxa were common to abundant.

TABLE B-2

Bird Species Recorded on the Guadalupe Mountain Study Area, August and September 1984 and April through June 1985

Common Name	Scientific Name	Abundance[a]	Status[b]
Eared Grebe	Podiceps nigricollis	U	T
White-faced Ibis	Plegadis chihi	U	T
Canada Goose	Branta canadensis	U	SR
Green-winged Teal	Anas crecca	C	T
Mallard	Anas platyrhynchos	C	SR
Blue-winged Teal	Anas discors	C	T
Cinnamon Teal	Anas cyanoptera	U	T
Northern Shoveler	Anas clypeata	C	T
Gadwall	Anas strepera	C	T
American Wigeon	Anas americana	C	T
Redhead	Aythya americana	C	T
Ring-necked Duck	Aythya collaris	C	T
Lesser Scaup	Aythya affinis	U	T
Hooded Merganser	Lophodytes cucullatus	U	T
Common Merganser	Mergus merganser	C	T
Ruddy Duck	Oxyura jamaicensis	C	T
Turkey Vulture	Cathartes aura	C	SR
Osprey	Pandion haliaetus	U	T
Sharp-shinned Hawk	Accipiter striatus	U	R
Cooper's Hawk	Accipiter cooperii	U	R
Northern Goshawk	Accipter gentilis	U	R
Red-tailed Hawk	Buteo jamaicensis	C	R
Golden Eagle	Aquila chrysaetos	U	R
American Kestrel	Falco sparverius	C	R
Prairie Falcon	Falco mexicanus	U	R
American Coot	Fulica americana	C	T
Semi-palmated Sandpiper	Charadrius semipalmatus	U	T
Killdeer	Charadrius vociferous	C	SR
American Avocet	Recurvirostra americana	C	T
Greater Yellowlegs	Tringa melanoleuca	U	T
Willet	Catoptrophorus semipalmatus	U	T
Spotted Sandpiper	Actitiu macularia	C	SR
Marbled Godwit	Limosa fedoa	U	T
Long-billed Dowitcher	Limnodromus scolopaceus	U	T
Common Snipe	Gallinago gallinago	U	T
Wilson's Phalarope	Phalaropus tricolor	C	T
Ring-billed Gull	Larus delawarensis	C	SR
Rock Dove	Columba livia	C	R
Band-tailed Pigeon	Columba fasciata	U	SR
Mourning Dove	Zeniada macroura	C	SR
Flammulated Owl	Otus flammeolus	U	R
Western Screech Owl	Otus kennicottii	U	R
Great Horned Owl	Bubo virginianus	U	
Burrowing Owl	Athene cunicularia	U	R
Northern Saw-whet Owl	Aegolius acadicus	U	SR
Common Nighthawk	Chordeiles minor	U	SR
Common Poorwill	Phalaenoptilus nuttallii	U	SR
White-throated Swift	Aeronautes saxatalis	A	SR
Broad-tailed Hummingbird	Selasphorus platycercus	C	SR

TABLE B-2 (CONTINUED)

Common Name	Scientific Name	Abundance[a]	Status[b]
Belted Kingfisher	Ceryle alcyon	U	SR
Lewis' Woodpecker	Melanerpes lewis	U	R
Hairy Woodpecker	Picoides villosus	U	R
Northern Flicker	Colaptes auratus	C	R
Olive-sided Flycatcher	Contopus borealis	U	SR
Western Wood-Peewee	Contopus sordidulus	C	SR
Dusky Flycatcher	Empidonax oberholseri	C	SR
Gray Flycatcher	Empidonax wrightii	U	SR
Western Flycatcher	Empidonax difficilis	U	SR
Say's Phoebe	Sayornis saya	U	SR
Ash-throated Flycatcher	Myiarchus cinerascens	U	SR
Eastern Kingbird	Tyrannus tyrannus	U	SR
Horned Lark	Eremophila alpestris	A	R
Tree Swallow	Tachycineta bicolor	C	T
Violet-green Swallow	Tachycineta thalassina	A	SR
Northern Rough-winged Swallow	Stelgidopteryx serripennis	U	T
Cliff Swallow	Riparia riparia	A	SR
Barn Swallow	Hirundo rustica	U	SR
Steller's Jay	Cyanocitta stelleri	C	R
Scrub Jay	Aphelacoma coerulescens	C	R
Pinyon Jay	Gymnorhinus cyanocephalus	C	R
Clark's Nutcracker	Nucifraga columbiana	C	R
Black-billed Magpie	Pica pica	C	R
American Crow	Corvus brachyrhychos	U	R
Common Raven	Corvus corax	U	R
Black-capped Chickadee	Parus atricapillus	U	R
Mountain Chickadee	Parus gambeli	C	R
Plain Titmouse	Parus inornatus	C	R
Common Bushtit	Psaltriparus minimus	U	R
Red-breasted Nuthatch	Sitta canadensis	U	R
White-breasted Nuthatch	Sitta carolinensis	U	R
Pygmy Nuthatch	Sitta pygmae	U	R
Rock Wren	Salpinctes obsoletus	C	SR
Canyon Wren	Catherpes mexicanus	C	SR
House Wren	Troglodytes aedon	U	SR
American Dipper	Cinclus mexicanus	C	R
Ruby-crowned Kinglet	Regulus calendula	U	T
Blue-gray Gnatcatcher	Polioptila caerulea	U	SR
Western Bluebird	Sialia mexicana	C	R
Mountain Bluebird	Sialia currucoides	C	R
Townsend's Solitaire	Myadestes townsendi	U	R
Veery	Catharus ustulatus	R	T
Hermit Thrush	Catharus guttatus	U	SR
American Robin	Turdus migratorius	C	R
Gray Catbird	Dumetella carolinesis	U	SR
Northern Mockingbird	Mimus polyglottos	U	SR
Sage Thrasher	Oreoscoptes montanus	C	SR
Water Pipit	Anthus spinoletta	A	T
European Starling	Sturnus vulgarus	C	R
Solitary Vireo	Vireo solitarius	U	SR
Warbling Vireo	Vireo gilvus	U	SR
Virginia's Warbler	Vermivora virginiae	C	SR

TABLE B-2 (CONTINUED)

Common Name	Scientific Name	Abundance[a]	Status[b]
Yellow Warbler	Dendroica petechia	A	SR
Yellow-rumped Warbler	Dendroica coronata	A	T
Black-throated Gray Warbler	Dendroica nigresens	C	SR
Townsend's Warbler	Dendroica townsendi	U	T
Grace's Warbler	Dendroica graciae	U	SR
Yellow-breasted Chat	Icteria virens	U	SR
Hepatic Tanager	Piranga flava	U	SR
Western Tanager	Piranga ludoviciana	C	SR
Rose-breasted Grosbeak	Pheuctucus ludovicianus	U	T
Black-headed Grosbeak	Pheucticus melanocephalus	R	SR
Blue Grosbeak	Guiraca caerulea	U	SR
Lazuli Bunting	Passerina cyanea	U	SR
Green-tailed Towhee	Pipilo chlorurus	C	SR
Rufous-sided Towhee	Pipilo erythrophthalmus	C	R
Chipping Sparrow	Spizella passerina	C	SR
Brewer's Sparrow	Spizella breweri	C	SR
Vesper Sparrow	Pooecetes gramineus	C	SR
Sage Sparrow	Amphispiza belli	C	SR
Song Sparrow	Melospiza melodia	C	SR
White-crowned Sparrow	Zonotrichia leucophrys	U	WR
Dark-eyed Junco	Junco hymealis	C	R
Red-winged Blackbird	Agelaius phoeniceus	U	SR
Western Meadowlark	Sturnella neglecta	C	R
Brewer's Blackbird	Euphagus cyanocephalus	C	SR
Brown-headed Cowbird	Molothrus ater	C	SR
Pine Grosbeak	Pinicola enucleator	U	R
Cassin's Finch	Carpodacus cassini	A	R
Red Crossbill	Loxia curvirostra	C	R
Lesser Goldfinch	Carduelis psaltria	U	R
Pine Siskin	Carduelis pinus	C	R
American Goldfinch	Carduelis tristis	U	R
Evening Grosbeak	Coccothraustes vespertina	A	R

[a]Abundance Categories

A - species is almost always seen in large numbers.
C - species is usually seen in numbers in suitable habitat.
U - species is not often seen but is not out of range.
R - species is very infrequently seen in the study area or is out of normal range.

[b]Status Categories

R - species is resident in study area year-round.
SR - species is resident only during the summer; often a breeding species.
WR - species is resident only during the winter.
T - species only occurs in study area during periods of spring or fall migration; or a wandering species.

APPENDIX C

USFWS SECTION 7 CONSULTATION

IN REPLY REFER TO
6800 (018)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Taos Resource Area
P. O. Box 1045
Taos, New Mexico 87571

July 23, 1982

Regional Director, Region 2
Attention: Gary Halvorson
U.S. Fish and Wildlife Service
P.O. Box 1306
Albuquerque, New Mexico 87103

Dear Mr. Halvorson:

This letter is concerning the submission and acceptance of a "Plan of Operation" by the Molycorp Division of Union 76. Submission of this document to our office was July 7, 1982. A brief summary of the proposed action is included in this letter along with maps of the area.

Our first request is for a formal list of T&E Species which might be affected by the proposed action. Two species are known to regularly occur in or frequent the area. They are wintering bald eagles and nesting peregrine falcons. The requested list is for species in addition to those named above.

This letter also serves as a request for formal consultation under Section 7 of the Endangered Species Act. This request is for the American peregrine falcon (Falco peregrinus anatum).

Our office has determined that a voluminous biological assessment is not necessary to declare a "may effect" situation. A brief biological assessment is, however, attached and the rationale for this determination is obvious. We believe that experts in the field of peregrine falcon/habitat relationships should examine and evaluate the possible impacts of a proposed action of this magnitude.

This office has not previously been involved in Section 7 consultation. Therefore, please advise us of any additional information we would need to provide, or of any required submissions by this office. A copy of the "Plan of Operations" is also enclosed.

Sincerely yours,

Richard C. Niemeyer

Richard C. Niemeyer
Taos Resource Area
Area Manager

Enclosures

FWS REG 2
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JUL 26 '82
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2-2-82-F-276

August 10, 1982

MEMORANDUM

TO : Area Manager, Bureau of Land Management, Taos Resource Area, P.O. Box 1045, Taos, New Mexico 87571

FROM : Regional Director, Region 2 (SE)

SUBJECT: Formal Section 7 Consultation re. Molycorp Tailing Pond Proposal

This acknowledges receipt of your request to initiate formal Section 7 consultation with the Fish and Wildlife Service in regard to Molycorp's proposal to acquire land for construction of a 700-acre tailing pond as required by the Endangered Species Act of 1973, as amended. The consultation period began on July 26, 1982, the date your request was received.

To assist this consultation, please provide information that evaluates how this action may effect the peregrine falcon and bald eagle as well as the magnitude of this effect. It is the responsibility of the consultee to furnish this information to the Fish and Wildlife Service so we may fully evaluate the effect of your action upon threatened and endangered species. We will process your consultation request within 90 days receipt of this information.

As a reminder, the Endangered Species Act requires that after initiation of formal consultation the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would avoid jeopardizing the continued existence of any endangered or threatened species or adversely modifying or destroying the critical habitat of any such species.

Thank you for assisting us to conserve listed species. If you have any questions, please call the Endangered Species Office at (505) 766-3972 or FTS 474-3972.

/s/ Michael J. Spear

cc: Area Manager, Phoenix Area Office, Phoenix, AZ
Field Supervisor, Ecological Services, Albuquerque, NM

Cons. # 83011

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Field Supervisor
Ecological Services, USFWS
Post Office Box 4487
Albuquerque, New Mexico 87196

December 2, 1982

Mr. Richard C. Neimeyer, Area Manager
Bureau of Land Management
Taos Resource Area
P. O. Box 1045
Taos, New Mexico 87571-1045

Dear Mr. Neimeyer:

This acknowledges receipt of your request to initiate formal Section 7 consultation with the Fish and Wildlife Service in regard to the Guadalupe Mountain Tailings Disposal Area as required by the Endangered Species Act of 1973, as amended. The 90-day consultation period began on November 24, 1982, the date your request was received.

We will process your consultation request as soon as possible within the 90-day time frame. If additional information or time is required, you will be contacted.

As a reminder, the Endangered Species Act requires that after initiation of formal consultation the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would avoid jeopardizing the continued existence of any endangered or threatened species or adversely modifying or destroying the critical habitat of any such species.

Thank you for assisting us to conserve listed species. If you have any questions, please call this Office at (505) 766-3966 or FTS 474-3966.

Sincerely yours,

R. A. Hoppe

Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Regional Director, FWS, AEV, SE, Albuquerque, New Mexico

Bureau of Land Management
Taos Resource Area

DEC 06 1982

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Field Supervisor
Ecological Services, USFWS
Post Office Box 4437
Albuquerque, New Mexico 87196

Cons. #2-22-83-F-011

February 18, 1983

Memorandum

To: Area Manager, Taos Resource Area, Bureau of Land Management, Taos, New Mexico

From: Field Supervisor, FWS, Ecological Services, Albuquerque, New Mexico

Subject: Section 7 Consultation Biological Opinion re: Bureau of of Land Management (BLM) Action to Allow Proposed Guadalupe Mountain Tailings Disposal Facility

This is in response to your July 23 request for formal Secton 7 consultation, as provided by the Endangered Species Act on your proposal to prepare an environmental Assessment, under the auspicies of the Federal Land Management and Policy Act (FR 43(242): 53764-53774), on the Molybdenum Corporation of America's proposed Guadalupe mountain tailings disposal area, Taos County, New Mexico.

On August 10, 1982, the Service requested information from the BLM on the effects of their action and also stated the biological opinion would be processed within 90 days receipt of this information. We received the Bureau's biological assessment dated November 24, 1982, on November 26, 1982.

The following background information and biological opinion are founded upon information furnished by the Bureau of Land Management, data in our files and discussion with personnel from the New Mexico Department of Game and Fish, Colorado Division of Wildlife and Colorado College. The proposed BLM action will result in the construction and operation of the Guadalupe Mountain tailings disposal facility, which is in proximity to the endangered bald eagle (Haliaeetus leucocephalus) and American peregrine falcon (Falco peregrinus anatum).

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BACKGROUND INFORMATION

The BLM's action of approval of the plan of operations will allow Molycorp, Inc., to construct and operate a 1,320-acre tailings facility approximately one half mile west of an exisiting disposal site or approximately three miles northwest of Questa, Taos County, New Mexico. This facility will serve the Molycorp Mine 12 miles east of Guadalupe Mountain and include a reservoir which will be created by constructing two dams, one each on opposite ends of a saddle separating the two peaks of the Guadalupe Mountain. The initial reservoir will be 700 acres ending with a final surface area of approximately 550 acres. A pumping station will be constructed on the east side of the facility to pump the tailings from the existing disposal site to the new tailings area. Decant of surface water and collected seepage will be transported to Pope Lake, part of the existing facility and then discharged to the Red River. In approximately 25-30 years the Guadalupe tailings area will be filled and then reclaimed through plantings of varied plants.

On March 16, 1978, the bald eagle was listed as endangered in the conterminous United States, except for several northwest and Great Lake States where it is designated as a threatened species. In 1982, an estimated 350 bald eagles were recorded in New Mexico during the mid-winter period. The Rio Grande, in vicinity of Guadalupe Mountain, supports 8 to 15 wintering bald eagles. The Guadalupe Mountains do not support the bald eagle, even though an occasional individual may fly in the vicinity of this area. It is doubtful if any activity from the tailings pond construction, or operation phase, or results of site reclamation will have an impact upon this eagle.

The peregrine falcon was listed as endangered on October 13, 1970. The anatum subspecies of this falcon, formerly widespread throughout North America, now exists as a breeding bird only in disjunct populations including the southern Rocky Mountains. Prior to widespread use of DDT in the late 1940's and 1950's, it is estimated that more than 300 pairs nested in the continental U.S. By 1970, as a result of pesticide contamination, the peregrine was extinct in the eastern U.S. and undergoing rapid declines throughout the rest of North America. Today, in the Rocky Mountain/Southwest region, less than 20 percent of the estimated historical (pre-DDT) breeding pairs exist.

The peregrine falcon is an inhabitant of the Questa area. This species was located in 1979 and even though data on their specific behavior is limited, it appears their prime foraging habitat is removed from the Guadalupe Mountain area. Reproduction from these falcons is good. The vast bulk of their prey items are bird species representative of forest and riparian communities.

Potential impacts to the peregrine falcon, as a result of the action include those human activities involving dam construction and maintenance (e.g., people and machinery moving around and resultant noise) and by creating pond conditions that will attract shore and other water birds to an area that was previously occupied by upland bird species--some species of which are prey for this falcon. There is some concern that these water birds may be highly pesticide contaminated and could pass this material on to the area peregrine falcons and eventually hurt their reproductive efforts.

I feel it is highly questionable if the project area will be used by the peregrines because of its distance to the primary peregrine falcon use area. Secondarily, there exists some question as to whether the pond area will actually serve as an attractant to water birds, much less the huge concentrations that might be needed to attract the peregrine falcon. I do not believe the peregrine falcon will be attracted to this area.

BIOLOGICAL OPINION

Based on this evaluation, it is my biological opinion that the proposed action is not likely to jeopardize the continued existence of the bald eagle or peregrine falcon.

Because it is questionable if your action will affect either species, I would recommend you implement a bald eagle and peregrine falcon record system that would help document the distribution of these species in the action area.

Further consultation is not required unless new information becomes available that discusses the bald eagle and peregrine falcon, new species are listed that may be affected by this action, or the proposed action is modified in a manner not considered in this biological opinion.

We appreciate your interest in endangered and threatened species. Please contact this office if you have any questions about this opinion.

Sincerely yours,

R. A. Hoppe

Richard A. Hoppe
Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, FWS, (OES), Washington, D.C.
Regional Director, FWS, AEV, SE, Albuquerque, New Mexico

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Field Supervisor
Ecological Services, USFWS
Post Office Box 4487
Albuquerque, New Mexico 87196

Cons. #2-22-83-I-011

July 1, 1986

Memorandum

To: District Manager, Albuquerque District, Bureau of Land Management, Albuquerque, New Mexico

From: Acting Field Supervisor, FWS, Ecological Services, Albuquerque, New Mexico

Subject: Review and comment on prey base analysis by habitat site, Taos Resource Area near Questa in Taos County, New Mexico (BLM)

This responds to your request for our review of the subject document and determination if further consultation under Section 7 is needed on the proposed Molycorp mill tailing project. We have reviewed the subject final project report and find that it contains considerable information relative to the quantity, availability and quality of the local avian prey base for peregrine falcons. We support the management recommendations stated in the report. We do not believe that additional consultation under Section 7 of the Endangered Species Act is necessary.

If you have any questions please call Charles Ault at (505) 766-3966 or FTS 474-3966.

Thomas F. O'Brien

Bureau of Land Management
Taos Resource Area

JUL 02 1986

cc:
Area Manager, Bureau of Land Management, Taos Resource Area
Attn: Ben Kuyhendal, Taos, New Mexico
Regional Director, FWS, Habitat Resources, Albuquerque, New Mexico

Taos Area Office

2 Multiple Resources
Ben

1 map 2

APPENDIX D

CULTURAL RESOURCES CONSULTATION CORRESPONDENCE

08/05/80 13:51 NM BLM STATE OFFICE FAX 5 [illegible]

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8110.19(010)
Guadalupe Mtn.

TAOS RESOURCE AREA
P.O. Box 1045
Taos, New Mexico 87571-1045
(505) 758-8851

October 12, 1982

Thomas W. Merlan
State Historic Preservation Officer
Historic Preservation Bureau
505 Don Gaspar Avenue
Santa Fe, New Mexico 87503

Dear Mr. Merlan:

Please find enclosed a proposal for a cultural resource inventory of the Molycorp Guadalupe Mountain tailings disposal area near Questa, New Mexico. The proposal was prepared by Tim Seaman and David Snow of the Museum of New Mexico and agreed to by you, Cindy Stark of Molycorp, and B.L.M. archaeologist, Ben Phillips in a meeting at the labratory of Anthropology October 5, 1982.

I concur with the approach outlined in the proposal. Thank you for attending the meeting on such short notice. I expect field work to begin immediately if Molycorp and the Museum of New Mexico negotiate a contract.

Sincerely yours,

Richard C. Niemeyer
Taos Resource Area Manager

010:BPhillips:ema:10/12/82

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8110.1(018)

TAOS RESOURCE AREA
P.O. Box 1045
Taos, New Mexico 87571-1045
(505) 758-8851

March 2, 1983

Ref: 2(II) 83-T

Mr. Thomas W. Merlan
State Historic Preservation Officer
Historic Preservation Bureau
505 Don Gaspar Avenue
Santa Fe, New Mexico 87503

Dear Mr. Merlan:

We have received a report from the Museum of New Mexico entitled: "Archaeological Investigations on Guadalupe Mountain, Taos County, New Mexico, Laboratory of Anthropology Note 309." The report describes cultural resources identified within the Guadalupe Mountain Tailings Disposal Area proposed by Molycorp, Inc.

We have accepted the report and concur with its recommendations. It is our opinion that the eleven archaeological sites recorded by the survey are eligible to the National Register of Historic Places as a group. The eleven sites (LA Nos. 38422, 38423, 38424, 38425, 38426, 38427, 38428, 38429, 38430, 38431, and 38432) are likely to yield important scientific information about Archaic and Basketmaker period subsistence in north central New Mexico. No architectural or heritage values were noted.

We will appreciate receiving your review of the report and opinion about the eligibility of the eleven archaeological sites.

Sincerely yours,

Richard C. Niemeyer
Taos Resource Area Manager

018:BPhillips:ema:3/2/83
018:BPhillips:ema:3/2/83
BP

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STATE OF NEW MEXICO
DEPARTMENT OF
FINANCE AND ADMINISTRATION
STATE PLANNING DIVISION

TONEY ANAYA
GOVERNOR

505 DON GASPAR AVENUE
SANTA FE, NEW MEXICO 87503
(505) 827-4950

March 7, 1983

Ref: C R Report 2(II)83.

Richard C. Niemeyer
Area Manager
Taos Resource Area
Bureau of Land Management
P.O. Box 1045
Taos, New Mexico 87571-1045

Dear Mr. Niemeyer:

Thank you for your letter of March 2, 1983 about recent archeological investigations on Guadalupe Mountain in Taos County.

I concur with the report's finding that LA 38422, LA 38423, LA 38424, LA 38425, LA 38426, LA 38427, LA 38428, LA 38429, LA 38430, LA 38431 and LA 38432 are likely to yield significant information about Archaic and Basketmaker period subsistence in the region (north central New Mexico) and accordingly meet criterion (d) of National Register eligibility. I agree that these sites have no architectural significance, do not have value for preservation and interpretation in place, and have no apparent association with existing Indian groups. In my opinion, they meet only criterion (d).

Please inform me of your plans for treating these sites and recovering the significant information from them.

Sincerely,

Thomas W. Merlan
State Historic Preservation Officer
Historic Preservation Bureau

TWM:jmg

TAOS RESOURCE AREA
CAIA — M-R
ACTG — I
ADMIN — HYDR
CLPA — NRS
RSUP — RSCN
— RSCN
— RSCN
— WLDL
— PRIM
— SENGR
— FSMN
— MSMN
— FILE
— LORY
— BLED

Bureau of Land Management
Taos Resource Area
MAR 09 1983

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SEP 24 1984

Mr. Thomas W. Merlan
State Historic Preservation Officer
Historic Preservation Division
Villa River, Room 101
Santa Fe, New Mexico 87503

Dear Mr. Merlan:

Enclosed is a cultural resource mitigation plan for Molycorp's molybdenum tailing facility on Guadalupe Mountain near Questa, New Mexico. It outlines a two-phase plan to be implemented on eleven archaeological sites (LA 28422-28432). It is the opinion of the BLM that there will be no adverse effect if these sites are mitigated according to this plan.

I will appreciate your comments on the proposed mitigation plan.

Sincerely,

Richard C. Niemeyer
Taos Resource Area Manager

Enclosure

7F

STATE OF NEW MEXICO
OFFICE OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

VILLA RIVERA, ROOM 101
228 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87503
(505) 827-8320

TONEY ANAYA
GOVERNOR

THOMAS W. MERLAN
DIRECTOR

JILL Z. COOPER
CULTURAL AFFAIRS OFFICER

October 17, 1984

Mr. Richard C. Niemeyer
Area Manager, Taos Resource Area
Bureau of Land Management
Montevideo Plaza, P.O. Box 1045
Taos, New Mexico 87571

Re: Concurrence in determination of no adverse effect through data recovery, Guadalupe Mountain Project

Dear Mr. Niemeyer:

Thank you for your letter of September 24, 1984 regarding the proposed cultural resource mitigation plan for eleven archaeological sites (LA 38422-38432) located on the proposed Molycorp molybdenum tailings facility on Guadalupe Mountain, near Questa, New Mexico. This mitigation proposal was submitted by the Laboratory of Anthropology in Santa Fe (Laboratory of Anthropology, Note No. 337).

As outlined, the mitigation program will consist of two phases of data collection and analysis. The first phase involves defining site boundaries, site mapping, and subsurface testing. The second phase involves more extensive excavation of sites with subsurface remains. The extent of Phase II excavation will be determined on the basis of Phase I results. Each phase will include analysis of retrieved materials with preparation of a final report. Copies of the final report should be submitted to this office and to the Laboratory of Anthropology. As noted in previous correspondence, the data recovery program is anticipated to provide significant information pertaining in particular to late Paleo and Archaic utilization of higher altitude areas of the northern Rio Grande. Very little work has been completed to date on this aspect of prehistory.

I concur with BLM's recommendation that the strategy outlined should be adequate to support a determination of no adverse effect through data recovery. In accordance with Section IX (C) of the statewide PMOA (NMSO-168), BLM may elect to afford the Advisory Council on Historic Preservation further opportunity to comment on the data recovery program.

I look forward to reviewing the results of the data recovery program.

Sincerely,

Thomas W. Merlan
State Historic Preservation Officer

cc: John Ware, Laboratory of Anthropology, Contract Archaeology

APPENDIX E

CULTURAL RESOURCES MITIGATION PLAN IMPLEMENTATION

The following implementation plan outlines data recovery that will be completed in 1989, subject to minor changes based on field decisions. The objectives of this work include site boundary definition, surface collection, subsurface examination, and analysis of collected materials.

GUADALUPE MOUNTAIN PROJECT

Implementation Plan

Introduction

This implementation plan and budget reflects minor changes from the interpretation of the scope of services reflected in an earlier document dated 10 August 1988, based upon extensive discussions with John Roney, Paul Williams, and Stephen Fosberg (BLM) on 25 August 1988.

Research Objectives

In the mitigation plan document for Guadalupe Mountain, Vierra (1984) identified a number of research issues related to both regional settlement and subsistence organization, and site-specific contexts of occupancy at Guadalupe Mountain for the Paleoindian, Archaic, Anasazi, Jicarilla Apache and Historic time periods. Although the specific details of research questions identified for each major period of human adaptation vary somewhat in Vierra's (1984) research design, the following research themes are common to all: chronological studies, site structure and function studies, technological studies, and subsistence studies.

In essence, the research design, proposed by Vierra (1984) and the mitigation plan offered by Ware and Vierra (1984) are dependent upon a central set of interrelated assumptions about the character of the archeological record, and concomitant expectations about the manner in which that record can be interpreted through data recovery and analysis. Stated briefly, assumptions and expectations are as follows:

1) Archeological sites are made up of assemblages of artifacts and features which are deposited during *specific temporal episodes* of site occupancy.

2) The *spatial structure* or association of artifacts and features resultant from these temporally specific assemblages can be interpreted through analysis to provide information concerning residential group size, composition, and activity differentiation.

3) The *content* of such assemblages (feature type, artifact type, etc.) can be interpreted through analysis to provide information about the character of subsistence related activities involved in food and technological resource extraction, distribution, and consumption.

4) Although many archeological site locations can be expected to be composite, or *palimpsest* overlapping concatenations of many such temporally specific assemblages, these sites can be analytically dissected into their component parts, such that each assemblage can be subjected to chronological, structural, and content analyses independently of the other assemblages at the site.

Potential difficulties with several of these expectations were identified by Seaman (1987) as a result of the first phase of data recovery at LA 38424. Seaman's findings indicate that the previous expectations of considerable spatial structure in associations between features and artifacts may not be merited; that the content of assemblages may be quite redundant through time; and that taphonomic factors may preclude routinely successful "analytical dissections" of the composite archeological record at Guadalupe Mountain (Seaman 1987;

58-59). In response to these preliminary findings, and in response to preliminary analyses, Seaman proposed a set of data recovery procedures and analyses for further work which emphasize the following lines of investigations at the Guadalupe Mountain sites.

Taphonomic studies: Implementation of surface collection, stripping, subsurface excavations and a parallel geomorphological assessment of post-occupational factors leading to apparent patterning (or lack of patterning) in the distributional structure of the archeological record.

Criteria for targeting best case assemblages for intensive analysis: Seaman (1987: 56-57) identifies criteria through which assemblages offering best potential as single-episode occupations can be recognized during inventory stages; and suggests that a sample of these be targeted for intensive data recovery to insure that conventional assemblage analyses can be performed on those assemblages which do meet conventional expectations of integrity.

Topographic Analyses: Preliminary analysis of artifact density and content variation at LA 38424 (Seaman 1987: 55-57) suggest that while conventional expectations of structural integrity, and chronological association of artifacts may not typify the Guadalupe Mountain archeological record; intriguing patterns in artifact content could be identified at a larger, topographic scale of association. Seaman (1987:58-59) thus proposes that a major focus of continued research should be to identify the scale of site occupancy at which spatial patterning in the distribution of artifacts and features becomes interpretable against behavioral referents.

Technological Analysis: Previous research has provided clear evidence that the basalt outcrop at Guadalupe Mountain served as a major technological resource for a several thousand year term of human occupancy and visitation to the locale. Data recovery and analysis procedures will specifically address the question if stylistic variability in raw material procurement and stages of core reduction can be identified at different locales; or identified in the same spatial locales. Expectations of assemblage content differences under conditions of embedded procurement or logistical acquisition of this resource will be evaluated. Similarly, a suite of analytical procedures will be used to definitively assess whether the numerous formal tools (unifaces and bifaces) at the Guadalupe Mountain locale are manufacturing *discards*, or are functionally intact and discarded or lost as a consequence of use. Results of both analyses (core reduction and formal tool analysis) can be used to further evaluate whether raw material acquisition and tool manufacture at the locale is an embedded or logistical activity; and whether the character of tool manufacture is redundant or variable at different places within the locale.

Feature Analyses: Finally, a sample of features (possible hearths) will be intensively examined through excavation in hopes that chronological functional and economic information can be retrieved.

The following sections will outline the implementation plan and schedule proposed to achieve these basic research objectives.

Field Methods

The proposed field effort encompasses the following tasks:

1) Resurvey of the 11 archeological sites (LA 38422–LA 38432) for the purpose of:

   - redefinition and plotting of sites and artifact concentration boundaries
   - relocation and plotting of features such as hearths and artifact concentrations thought to represent discrete reduction episodes
   - collection and plotting of formal tools and obsidian artifacts
   - identification of areas within concentrations for controlled surface collection

2) Controlled surface collection of a 10% areal sample of the 20 artifact concentrations distributed among 10 of the 11 sites. A total of 6000 sq m will be targeted for collection, with ca. 60% of the area (or 3600 sq m) to be collected in 1 sq m units, and ca. 40% (or 2400 sq m) to be collected in larger "dogleash", quadrat, or transect units. Decisions as to unit size, shape and sample placement will be made in consultation with the BLM, based upon infield analysis of artifact distributions.

3) Hand excavation of five of the 10 identified features on sites LA 38422, LA 38424, LA 38431, and LA 38432.

4) Hand excavation of a total of 40 1 x 1 m test pits within the areas subjected to surface collection, or in the vicinity of features (subject to consultation with the BLM).

5) Mechanical excavation of approximately 100 linear m of trenches in support of studies conducted by a consulting geomorphologist.

Because of the wide variety of tasks that must be performed simultaneously among the 11 sites, 3 independent teams consisting of a crew leader and a single assistant archeologist will be employed. Site resurvey will, however, be performed by the entire crew of 6, plus the project director. The initial intensive resurvey will focus on each of the 11 sites as they are defined by Seaman (1983:Figure 2), and will maintain a transect spacing of 8 meters. All artifacts, discrete reduction events and hearth features will be marked by pin flags and survey tape in order to identify artifact concentrations and features appropriate for controlled surface collection and excavation. All lithic tools and obsidian artifacts will be uniquely marked during resurvey to facilitate subsequent collection and piece plotting of these items.

At this point, the three crews will begin three separate recording tasks. One crew will perform the tool and obsidian collections and plot each item's location on 1":200' scale contour maps, supplied by the BLM. This crew will also plot the locations and identification numbers of features, artifact concentrations and site boundaries, as defined by the limits of visible cultural material and/or topographic features. The second crew will begin the process of setting provenience controls for surface collection and excavation in areas identified by the Project Director, in consultation with the BLM. This crew will also complete a detailed topographic map of each collection area. On sites where one or more of the five features chosen by the Project Director (in consultation with the Project COAR) for excavation, a collection area will automatically be established surrounding the feature. The third crew will assist in the establishment of provenience controls and begin the task of surface collection within the 1 x 1 m grid system immediately. Excavation of test pits and/or features will be initiated only after completion of the surface collection and topographic map by one or two of the three crews, depending on the size of the collection area and number of features chosen for data recovery.

Decisions concerning the number and size of grid collection areas will be made based upon field analysis of survey sweep data, and in consultation with the BLM. The exact locations of all collection and excavation units will be recorded on the 1":200' map. Features and test pits will be excavated as separate units as described in section D. 3. a. and D. 3. b. of the Task Scoping Request. An area between 12–16 sq m will be surface stripped around each excavated feature, and this area will be expanded as required to encompass associated artifact distributions or additional features. If encountered, these features will be substituted towards the target of 5 features, and additional surface stripping (beyond a 4 x 4 m area) will be substituted for the targeted number of test pits within the collection unit.

A geomorphological study of the Guadalupe Mountain caldera will be conducted in conjunction with the archeological studies. This study will utilize a series of backhoe trenches, placed judgmentally by the geomorphologist, in describing the non–cultural stratigraphy of the caldera. If warranted, radiocarbon, pollen and other samples will be collected from the geomorphic trench profiles.

A total of 166 person days is required to complete the above tasks exclusive of travel PI and PD supervision, and anticipated weather down time. A breakdown of the proposed effort by project phase and line item is provided as an attachment. These estimates are largely based on experiences gained during field work conducted by OCA at LA 38424 in 1987. The following rates were used in computation of these estimates:

Activity	Estimated Units	Rate	# Person days
intensive site survey	131 linear miles	4.4 miles /person day	30
grid collection	6000 sq m	250 sq m/person day	24
feature excavation	5 features	7.6 person days/feat	38
test excavation	20 cu m (40x.5x1x1)	0.5 cu m/person day	40
site set up/infield analysis			34
Total			166

An additional 26.25 person days are needed for travel during the 3 10–day field sessions, and 15.25 person days have been allocated for inclement weather down time (to be allocated to other elements of the project if not needed during fieldwork). This results in a total field effort of 34 elapsed field days for a crew of 7 (PD, CCs, and CMs). The project schedule is illustrated in a milestone chart attached to this Task Scoping.

Laboratory Analysis and Report Preparation

As artifacts and samples are recovered during fieldwork through either excavation or surface collection, a field specimen catalog will be maintained associating each lot of items with a minimal provenience unit and a unique specimen number. At the end of each field session, collected archeological materials will be returned to OCA for processing and checking against the field catalog, which will be entered into the project data base system. After washing, artifact processing will involve sorting the items by general artifact class for distribution to the appropriate analysts. Samples will be appropriately processed and sent to specialists for analysis. Lithic artifacts recovered previously from LA 38424 by OCA (Seaman 1987) will also be included in the latter stages of artifact processing and all subsequent analyses.

Lithic analyses will focus on aspects of lithic technology as they relate to site function in the Guadalupe Mountain assemblages. Special attention will be given to identifying raw materials and analyzing this material in terms of these groups, as it can be assumed that all non-basalt lithic material was transported into the Guadalupe Mountain caldera. Thus, raw material variability among the assemblages should accurately reflect the geographic range of groups using Guadalupe Mountain, and it may be possible to isolate manufacture and maintenance strategies for introduced or "foreign" lithic tools from those manufactured from the local basalt and, possibly, used on Guadalupe Mountain. Special attention will also be given to separating out discarded and used tools from those discarded as manufacturing failures through lithic analysis.

Two separate but related lithic analyses aimed at site function are planned. The first will focus on the by-products of manufacture. While the use history of lithic tools themselves can be quite complex, the by-products of tool manufacture and maintenance generally remain where the manufacturing or maintenance occurred, thus providing a more accurate indication of the activities performed at a location. The second analysis will record additional attribute information on retouched lithic tools and ground stone implements. The emphasis in these studies will be on identifying patterns among objective measures of tool morphology, breakage patterns and utilization that may indicate whether tools were manufactured an/or used and discarded on the Guadalupe Mountain sites.

This analysis will record the following variables for all recovered artifacts:

- Material type (Warren coding system)
- Artifact type
- Condition/Portion
- Cortex % (dorsal cortex on flakes)
- Dimensions (length, width, thickness in mm)
- Weight (g)
- Platform type (flakes only)
- Heat treatment
- Utilization

For retouched and formal tools additional variables were recorded:

- Bifacial manufacture stage
- Functional completeness
- Utilization
- For each retouched edge:
  - Edge location
  - Edge completeness
  - Edge length
  - Edge shape
  - Direction of use/retouch
  - Retouch scar length
  - Edge angle

For ground stone tools additional data were recorded for:

- Burning
- Use location
- Edge/surface cross section
- Edge/surface preparation
- Number of impact scars

Predominant wear pattern
Surface dimensions (length, width, thickness in mm)

These and other excavation and analysis data will entered into a project data base, created and maintained at OCA. Including the 3667 items collected previously on LA 38424, it is estimated that a total of 15,000 pieces of debitage will be collected along with 1250 formal tools. An appropriate sample of these will be subjected to intensive analysis, as outlined above, after preliminary sorting; the size and nature of that sample will be determined in consultation with the BLM. After the completion of analysis, all artifacts will be curated at the Maxwell Museum of Anthropology, University of New Mexico. The draft final report will integrate the results of artifact analyses with excavation and surface collection data, and the results of specialized studies, and will address the research concerns outlined previously.

Approximately 424 person days are required to complete the analyses and draft report (Attachment A).

Project Schedule and Deliverables

The project will be completed within a period of 40 working weeks (see attached chart). Prefield and gear up activities will take approximately 2 weeks, and fieldwork will take an added 7 weeks. Three 10 day field sessions will be conducted on Guadalupe Mountain. Artifact processing, analyses, and report production are scheduled to take an additional 19 weeks, and after the receipt of BLM comments, 12 weeks will be needed for final report production. A catalog of all collected artifacts and samples will be delivered to the BLM prior to the 21th project week and the draft final report will be submitted at the 35th project week.